MILFORD PLANNING

MP ref: M1622-RAL-2
DA ref: RAL24/0041
QA: ms.gm.mc

30 October 2024

Assessment Manager
Townsville City Council
PO Box 1268
TOWNSVILLE QLD 4810
Via: *TOLS*

Attention: Taryn Pace – Planning and Development

Dear Taryn,

Re: Response to Information Request
Development Application seeking a Development Permit for Reconfiguring a Lot – Subdivision (One Lot into 193 Lots, and Pump Station, Park, and Balance Lot) on land described as Lot 1001 on SP345441 and located at 683 North Shore Boulevard, Mount Low

On behalf of the Applicant, Milford Planning refer to the abovementioned development application and to correspondence dated **6 September 2024**, being the formal Information Request issued by Townsville City Council (Council) (refer **Attachment 1**).

In response to Council's Information Request, and in accordance with Section 13.2 of the Development Assessment Rules, we hereby provide a response to all of the information requested as detailed in **Table 1** below.

Table 1 – Response to Information Request

Item	Response
Item 1 Amended Flood Impact Assessment	This item requests an amended Flood Impact Assessment utilising the latest data, specifically addressing the immunity of the pump station, and clarifying technical elements. In response to this item, and in accordance with discussions between the Applicant's representatives and Council's engineers, a technical response has been prepared by Northern Consulting Engineers and provided in the Engineering Response (refer **Attachment 2**).

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Table 1 – Response to Information Request	
Item	**Response**
	The response prepared by Northern Consulting Engineers references the detail provided in the original Flood Impact Assessment and provides a direct response to Council's queries regarding instabilities, the appropriateness of the use of the adopted flood model, the verification process, and the immunity of pump station infrastructure.
Item 2 Water Infrastructure	This item requested clarification regarding the detail in the DPM water assessment regarding fire flow modelling which has been completed for Stage 6. The clarification specifically relates to ensuring fire flow modelling shows adequate results for all previous stages. In response to this item, a technical response has been prepared by Northern Consulting Engineers and provided in the Engineering Response (refer **Attachment 2**). The technical response confirms that stage specific water network analyses will be prepared and provided to Council during the relevant operational work phase.
Item 3 Sewer Infrastructure	This item requests clarification regarding the detail in the DPM sewerage assessment, including ensuring compliance with relevant standards is achieved. In response to this item, a technical response has been prepared by Northern Consulting Engineers and provided in the Engineering Response (refer **Attachment 2**). The technical response confirms that detailed design of the pump station operational specifics will be confirmed during the relevant operational work phase. Additional information regarding the total capacity of the pump stations is also provided in the technical response, as well as detail regarding the functional strategy and integration with the wider trunk infrastructure network as the delivery of trunk infrastructure progresses. The level of flood immunity for the pump station infrastructure is also confirmed to be to a 1% AEP event.
Item 4 Amended Traffic Impact Assessment	This item requested an amended Traffic Impact Assessment, specifically to include a sight distance assessment of the unsignalised intersection with North Shore Boulevard, include details of the turn warrant assessment completed, and ensure the latest traffic count data is used. In response to this item, Bitzios Consulting have prepared an updated Traffic Impact Assessment (refer **Attachment 3**) inclusive of a sight distance assessment for the intersection of the proposed new road connection with North Shore Boulevard. Section 3.4 of the updated Traffic Impact Assessment includes the relevant sight distance assessment details. The results from the Turn Warrant Assessment completed for the proposed development and referenced in the Traffic Impact Assessment have been included as Appendix F in the updated Traffic Impact Assessment report for Council's information. As per discussions with Council following issue of this Information Request, Council have subsequently provided acceptance of the traffic volume data utilised. In particular, the traffic data used in the intersection analysis presented is based on the assumption that more traffic will use North Shore Boulevard-Lionel Turner Drive to/ from Bushland Beach, hence the resultant traffic volumes queried by Council.

Table 1 – Response to Information Request	
Item	**Response**
Item 5 Amended Ecological Assessment	This item requested an amended Ecological Assessment, specifically to determine if the *'shallow depression with no defined bed and bank'* traversing the development area from the southwest to the northeast is an old levee or a prior stream. It was subsequently confirmed in discussions with Council that the area referred to is as identified in green below.  In response to this item, Terra Solutions have completed further analysis of the area identified by Council and confirm that the regional ecosystem on this part of the site is 'least concern' RE 11.3.35, and is representative of vegetation associated with a prior stream or levee. Although least concern, the area is classified as an 'area of high environmental importance' under the planning scheme. In accordance with SC6.9 Natural Assets Planning Scheme Policy, the planning scheme overlay mapping results from the combination of the landform being representative of a historic waterway, and regional ecosystem which has the potential to support 'at risk' species, rather than the environmental value of the land itself. It has been identified that the 'at risk' species relates to essential habitat for Eastern Curlew. Terra Solutions' site specific investigations have determined that this regional ecosystem criteria for the Eastern Curlew is not relevant to the site due to the absence of suitable habitat for the species. As such, based on the site specific investigation completed, the subject area would not be mapped as an 'area of high environmental importance' based on the planning scheme policy criteria. Additional detail specifically addressing the area described above has been added to an amended Ecological Assessment (refer **Appendix 4**).

Proceeding

We trust the above and attached information is sufficient to allow Council to assess the development application. If Council is of the view that the response does not appropriately address the Information Request, we request the opportunity to meet to discuss further.

Correspondence regarding the intention to commence public notification will be issued to Council for its information shortly.

If you have any questions regarding this correspondence, please contact the undersigned or George Milford on TEL: (07) 4724 0095.

Yours sincerely,

MILFORD PLANNING

Matteo Sandona

SENIOR TOWN PLANNER

Encl: Attachment 1 – Council Information Request
Attachment 2 – Engineering Response prepared by Northern Consulting Engineers
Attachment 3 – Updated Traffic Impact Assessment prepared by Bitzios Consulting
Attachment 4 – Updated Ecological Assessment prepared by Terra Solutions

MILFORD PLANNING

Attachment 1

RECEIVED
BY MILFORD PLANNING
6-9-24

City of Townsville

Date >> 6 September 2024

PO BOX 1268, Townsville
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Milford Planning
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Email >> info@milfordplanning.com.au

Dear Sir/Madam

Information Request
Planning Act 2016

As per our telephone conversation on 6 September 2024 please be advised that, upon review of the below mentioned development application, further information is required to undertake a comprehensive assessment. In accordance with section 12 of Development Assessment Rules under the *Planning Act 2016* the following information is requested.

Application Details

Application no:	RAL24/0041
Assessment no:	12911001
Proposal:	Lot Creation - One Lot into 193 Lots and Pump Station, Park and Balance Lots
Street address:	683 North Shore Boulevard MOUNT LOW QLD 4818
Real property description:	Lot 1001 SP 345441
Applicant's reference:	M1622-RAL-2

The information requested is set out below >>

Request Item 1 – Amended Flood Impact Assessment

The Revision C of report is dated 05/10/18. The applicant is requested to provide an amended Flood Impact Assessment by addressing the following items:

1. Section 1.3
   - provide justification why the inflows in the model cannot be verified.
   - provide evidence why the net rainfall data generated in the model cannot be aligned with the TCC-supplied data.
   - include other AEP (Annual Exceedance Probability) floods up to Defined Flood Event in the flood impact assessment.

2. Section 3.2.1
   - resolve the model instability issues without uncoupling the structures from the MIKE FLOOD setup.

3. Update flood model with the recent data.

4. Verify 1% AEP flood model result with the available data.

5. Include sewerage pump station in the assessment.

Reason
To demonstrate compliance with Flood hazard overlay code of the Townsville City Plan.

Request Item 2 – Water - Further information: Water & Sewerage Planning Report
The applicant is requested to confirm that modelling results show adequacy for earlier stages before Stage 6 eventuates. DPM Water report (Appendix pp36-38) indicates that fire flow modelling has only been performed on node RP-St6-9 (Stage 6).

Reason
To demonstrate compliance with Performance Outcome PO25 of the Reconfiguring a lot code of the Townsville City Plan.

Request Item 3 – Sewer: Amended Water & Sewerage Planning Report
The applicant is requested to address the following items within the Water & Sewerage Planning report by DPM Water:

1. The two new pump stations (PS) must be duty assist and not duty standby as per CTM Code Table 10 Section D5 and footnote 13.

2. Modelling assessment must include analysis of scenarios at 5-year intervals as per Section SC6.4.11.4 Sewerage Planning and Design Guidelines of the development manual.

3. Operating depth and pump size is designed using the fully developed Precinct 1 of 943 lots (2,640 EP's) on Page 18 - PS ML07. Demonstrate the functionality of the system particularly addressing the PS's fill and storage times in the earlier years when loading is small and whether septicity and odour issues may arise during the intermediate years.

4. ML06 should be ML08 on p18.

5. Summary and Conclusions must include the estimated initial and fully developed duty points for PS ML07. For the initial status of pumping directly into the existing sewer rising main, the operating range must be specified rather than a single point.

6. All PSs are to be immune of inundation from a 1% AEP event.

Reason
To demonstrate compliance with Performance Outcome PO25 of the Reconfiguring a lot code of the Townsville City Plan.

Advice relating to sub-items above

1. The applicant must satisfactorily demonstrate to council for acceptance of deviation from duty assist to duty standby PS.

3. For an average rate of development at 50 lots p.a., it is almost 19 years for Precinct 1 to become fully developed, which is beyond the typical design life of the pumps. Shallower operating range may be considered in the interim.

5. An operating range, as opposed to single point, assists designers in selecting a pump with the right duty.

Request Item 4 – Amended Traffic Impact Assessment

The applicant is requested to address the following items within the Traffic Impact Assessment by NCE:

1. Site access is proposed via Northshore Boulevard/ Road 1 intersection forming an unsignalised intersection. In accordance with Austroads Guide to Road Design Part 4A Section 3.2, a review for the Safe Intersection Sight Distance (SISD) is required for the proposed unsignalised intersection (Also refer to Section SC6.4.6.1 of the Townsville City Plan and Chapter 9 of TCC's TIA Guidelines May 2024).

2. Section 4.4.4 of TIA report mentions that turn warrant assessment for a BAL/BAR and AUL/CHR has been conducted for North Shore Boulevard/Road1 intersection but has not been provided. Turn Warrant Assessment Report supporting BAL/BAR is required for North Shore Boulevard/Road 1 intersection (Refer to Austroads GRD4A Section 5, Austroads GTM 06 Section 3.3.5).

3. North Shore Boulevard and Mount Low Parkway traffic volumes used for all intersections analysis (SIDRA Analysis) refers to a previous study - Mt Low Master Planned Community-Interim Traffic Modelling and Impact Assessment Report 2018. These volumes are significantly lower than the existing conditions. TCC Forecast Traffic Model includes the proposed Lionel Turner Drive and must be used for the analysis. Traffic count data must be in accordance with SC6.4.5.2 4(a)(i) of the Townsville City Plan.

Reason

To demonstrate compliance with Performance Outcome PO1 of the Transport impact, access and parking code of the Townsville City Plan.

Request Item 5 – Amended Ecological Assessment Report

The applicant is requested to conduct additional investigation to determine if the '*shallow depression with no defined bed and bank*' traversing the development area from the southwest to the northeast is an old levee or a prior stream. If it is an old levee or prior stream and located within the RE11.3.35, it recommended that it not be developed and included in the development's watercourse/open space network. An amended Ecological Assessment Report must be submitted to Council.

Reason

To demonstrate compliance with Performance Outcome PO1 of the Natural assets overlay code of the Townsville City Plan as RE11.3.35 is identified within SC6.9 Natural assets planning scheme policy as being a matter of Very High environmental significance when located on old levees and prior streams.

Advice

Alternative measures (such as enhancement of existing corridors and open space) could be considered if retention of this area is not possible.

End of Information Request >>

Under the provisions of the Development Assessment Rules under the *Planning Act 2016*, you have three options available in response to this Information Request. You may give the assessment manager (in this instance Council):

(a) all of the information requested; **or**
(b) part of the information requested; **or**
(c) a notice that none of the information will be provided.

For any response given in accordance with items (b) and (c) above, you may also advise Council that it must proceed with its assessment of the development application.

Please be aware that under the Development Assessment Rules under the *Planning Act 2016*, the applicant is to respond to any Information Request within **3 months** of the request. If you do not respond to the Information Request within this time period, or, within a further period agreed between the applicant and Council, it will be taken that you have decided not to provide a response. In the event of no response being received, Council will continue with the assessment of the application without the information requested.

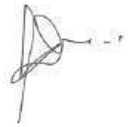
Council prefers that all of the information requested be submitted as one package. If any additional matters arise as a result of the information submitted, or, as a result of public notification (where applicable), you will be advised accordingly.

Should any referral agency make an information request, you are reminded of your obligation to provide council with a copy of the information response provided to that referral agency.

You may wish to follow the progress of this application using PD Online on Council's website www.townsville.qld.gov.au

If you have any further queries in relation to the above, please do not hesitate to contact Taryn Pace on telephone 07 4727 9426, or email developmentassessment@townsville.qld.gov.au.

Yours faithfully



For Assessment Manager
Planning and Development

MILFORD PLANNING

Attachment 2

NORTHERN CONSULTING engineers

Phone: 07 4725 5550
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Email: mail@nceng.com.au
Web: www.nceng.com.au
50 Punari Street Currajong Qld 4812

Our Ref: **TUR1301/01:AW**
Your Ref: **RAL24/0041**

Monday, October 28, 2024

The Chief Executive Officer
Townsville City Council
PO Box 1268
TOWNSVILLE QLD 4810

Attention: Development Assessment and Infrastructure – Northern Team

To whom it may concern,

RE: **MOUNT LOW DEVELOPMENTS – 683 NORTH SHORE BOULEVARD (RAL24/0041) RESPONSE TO INFORMATION REQUEST ITEMS 1, 2 AND 3**

An Information Request has been received in relation to the Reconfiguration of a Lot application for the above-mentioned project, dated 6 September 2024.

In accordance with the Development Assessment Rules under the Planning Act 2016 and on behalf of our client Mount Low Developments, we provide all information requested to the items noted within the above-mentioned Information Request, as follows:

Request Item 1 – Amended Flood Impact Assessment

The Revision C of report is dated 05/10/18. The applicant is requested to provide an amended Flood Impact Assessment by addressing the following items:

1. Section 1.3
   - provide justification why the inflows in the model cannot be verified.
   - provide evidence why the net rainfall data generated in the model cannot be aligned with the TCC-supplied data.
   - include other AEP (Annual Exceedance Probability) floods up to Defined Flood Event in the flood impact assessment.
2. Section 3.2.1
   - resolve the model instability issues without uncoupling the structures from the MIKE FLOOD setup.
3. Update flood model with the recent data.
4. Verify 1% AEP flood model result with the available data.
5. Include sewerage pump station in the assessment.

Applicant's Response

NCE refer to the meeting held in the Council Cape Pallarenda Meeting Room on the 19th September. During the meeting, it became clear that the request item was written on the basis that the entire development area was understood to part of the current development application. As discussed therein and as outlined in section 3.0 of the engineering report, the current application only covers Precinct 1 which is limited to the eastern portion of the site in between North Shore Boulevard and the drainage feature of which is primarily located within the low hazard area. For convenience, this section of the report is copied below:

Excerpt from NCE Engineering Report TUR1301-ENG (C):

3.0 FLOOD HAZARD

NCE have conducted a Flood Impact Assessment (FIA) for the development and proposed staging to ensure the development does not generate any actionable afflux and that the development will comply with TCC's flood hazard overlay code, in particular PO6 and PO7. The full report is provided in ***Appendix B****.*

In reference to TownsvilleMAPS City Plan Web Map Service, the vast majority of the development is shown to be within the low hazard flood zones. A small portion of the site is within the medium hazard area. The high hazard areas are generally restricted to the balance lot within the deep sections of the drainage feature. This portion of the overall site is generally higher elevation in relation to the surrounding terrain, as demonstrated in the dominant low hazard areas shown in ***Figure 3-1*** *below.*

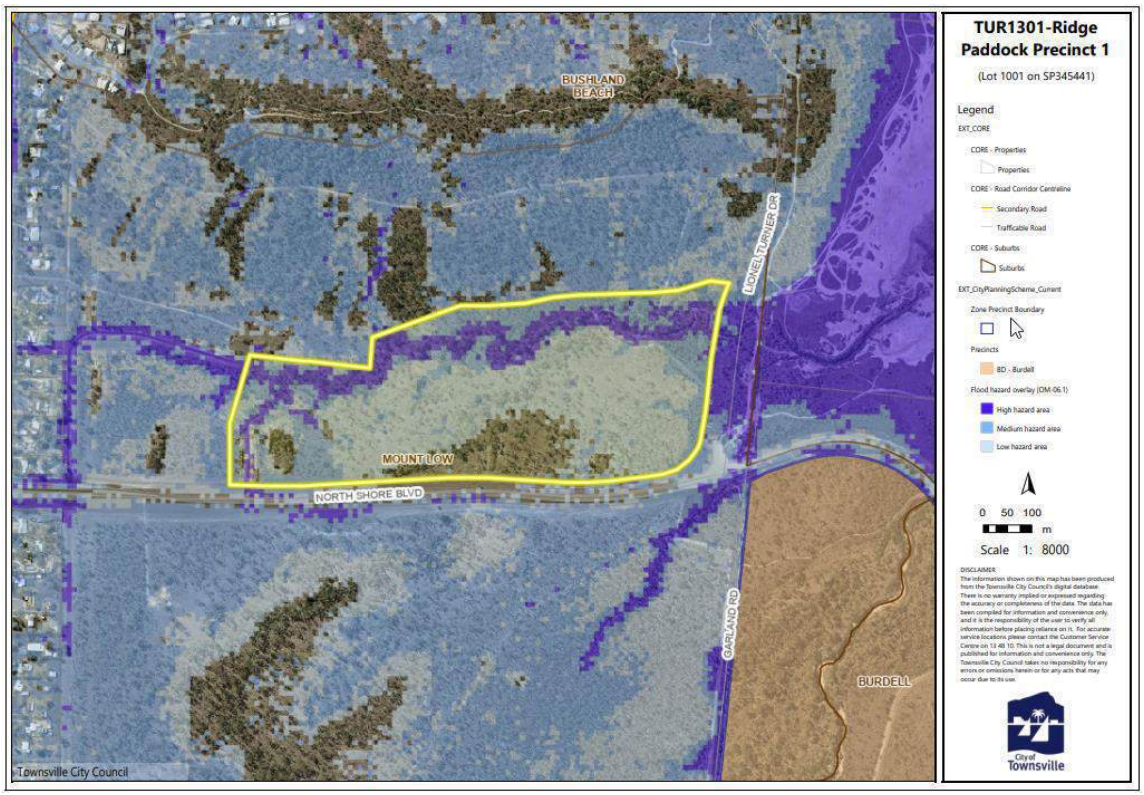


Figure 3-1 *TownsvilleMAPS Flood Hazard Mapping (Majority of Precinct 1 within Low Hazard)*

It is noted that the FIA was carried out based on a previous layout which the current Precinct 1 was referred to as Precinct B but included a larger extended area. The overall extent of this former layout was larger than currently proposed and with higher number of lots. Whilst the updated layout has changed, the overall outcome of the revised Precinct 1 is a lower impact and less extensive. Therefore, the outcomes of the FIA are considered to cover this initial Precinct 1. The FIA was carried out in accordance with the current adopted planning scheme flood modelling and reporting and therefore consider current.

The proposed development is expected to change the impervious area where an increase in run-off is anticipated. The FIA has assessed the proposed development inclusive of increased impervious areas and channelisation of flows. The eastern portion of the Precinct B estate which corresponds to Precinct 1, generally results in no impacts off site. There is a small area of minor local impacts off-site at the south-east of the estate, however this is the result of local filling and disruption of the minor table drains and does not impact the function of the roadway. This can be addressed by introducing very minor cut drains or underground drainage to prevent any local ponding.

There is some minor afflux associated with the future precincts to the west and south, however this is minor, does not impact the function of any roadway and not part of the current Precinct 1. The land parcel however is owned / controlled by the applicant.

The FIA also includes the entire of the future master-planned development demonstrating that the estate can achieve a non-worsening outcome with mitigation measures throughout. The FIA has demonstrated that the development does not result in any actionable impacts off site.

In addition, the flood study demonstrates an overall positive drainage outcome for the properties on Mount Low Parkway which have historically experienced flooding and nuisance drainage.

As a result, the proposed development of Precinct 1 is considered to comply with the requirements of the flood hazard overlay code.

It is proposed that any future development beyond Precinct 1 would require an updated FIA in accordance with the latest TCC flood study at the time.

Notwithstanding the outcomes of the FIA, to address the coastal environment overlay code, all allotments will be located at or above RL 3.9m AHD to avoid any increase in risk to people or property.

The property is not located within the erosion prone area.

*Refer to **Appendix B** for the full flood impact assessment.*

It's understood this explanation and background satisfied Council, however the following responses are provided to the individual items:

1. As discussed in the meeting, NCE purchased and utilised the Council Lower Bohle Flood Study. When issued to NCE, the model did not run and once running had a number of instabilities required substantial input and rectification by NCE in order to provide a functional model that ran. NCE sought assistance from Council to rectify the issues. Council provided a number of changes but which did not remove the instabilities. Council later advised they were unable to assist further and it was the responsibility of the applicant.

Once the issues were rectified, the results aligned with the adopted Council flood study results demonstrating that the changes were in accordance with the original model. Due to the issues with the model, the events available to run were limited.

- The flows were verified to be aligned with the original Council results.
- The rainfall data was the Council supplied data.
- NCE have modelled the events available considering the issues with the model as supplied. Given that the site is on the highest portion of the entire englobo land and already clear of the 1% AEP event combined with the site being located at the furthest downstream point on the site, the minor event will not impact the site or surrounds.

2. As per the above and as discussed in the meeting there are no instabilities of concern and the model ran to achieve non-worsening off site.

3. The model was carried out utilising Council's current adopted model. No further input required.

4. The model utilised was the current adopted Council model with a verification carried out showing the results were as expected. As an additional check, the below screenshots show the MIKE baseline model results compared to the same location in TownsvilleMAPS Flood Query Results. The MIKE results show a 1% AEP flood level of 3.531m and the TownsvilleMAPS results show 3.53m.

5. The sewer pump station within the site under the current application is shown to be clear of the 1% AEP event. The final design will provide the pump station with any necessary freeboard to the DFL.

Fig 1 – MIKE 1% AEP WSL Results

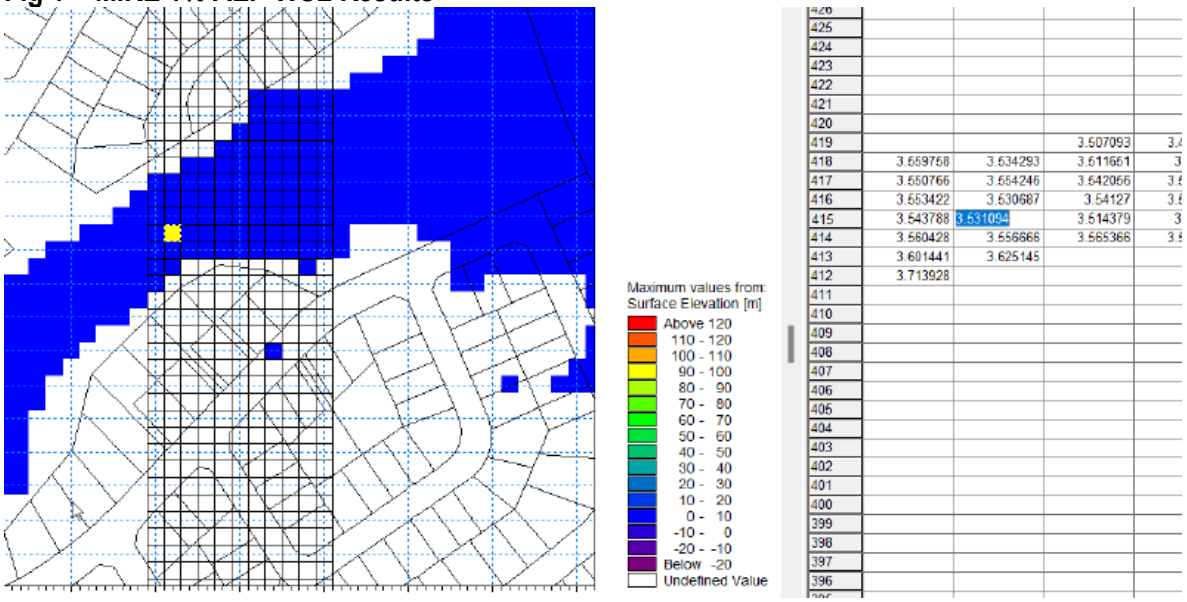
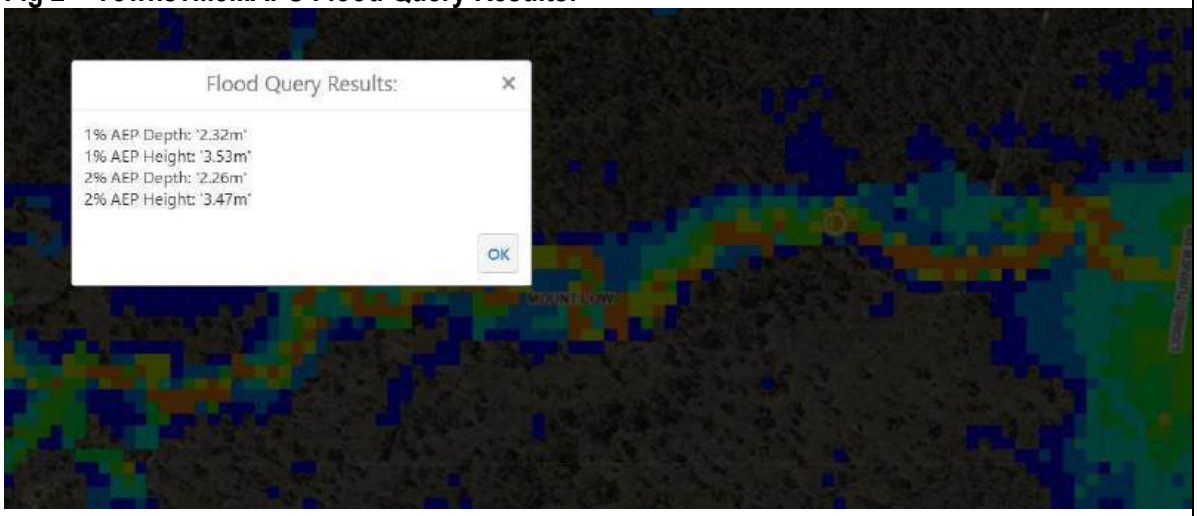


Fig 2 – TownsvilleMAPS Flood Query Results:



Request Item 2 – Water – Further Information: Water & Sewerage Planning Report

The applicant is requested to confirm that modelling results show adequacy for earlier stages before Stage 6 eventuates. DPM Water report (Appendix pp36-38) indicates that fire flow modelling has only been performed on node RP-St6-9 (Stage 6).

Applicant's Response

Response provided by DPM Water:

The DPM Water report provides the overall water strategy for Precinct 1 of Ridge Paddock (ie Stages 1 to 10). As each development stage is to be progressed a separate stage specific water assessment will be developed and provided to Council as part of the Operational Works application. This stage specific assessment will confirm the water infrastructure for that stage (and any previously approved/constructed stages) meets the minimum peak hour and fire flow pressure standards.

Stage specific water network analyses are provided as a standard and will be required for each OPW application.

Request Item 3 – Sewer: Amended Water & Sewerage Planning Report

The applicant is requested to address the following items within the Water & Sewerage Planning report by DPM Water:

1. The two new pump stations (PS) must be duty assist and not duty standby as per CTM Code Table 10 Section D5 and footnote 13.

2. Modelling assessment must include analysis of scenarios at 5-year intervals as per Section SC6.4.11.4 Sewerage Planning and Design Guidelines of the development manual.

3. Operating depth and pump size is designed using the fully developed Precinct 1 of 943 lots (2,640 EP's) on Page 18 - PS ML07. Demonstrate the functionality of the system particularly addressing the PS's fill and storage times in the earlier years when loading is small and whether septicity and odour issues may arise during the intermediate years.

4. ML06 should be ML08 on p18.

5. Summary and Conclusions must include the estimated initial and fully developed duty points for PS ML07. For the initial status of pumping directly into the existing sewer rising main, the operating range must be specified rather than a single point.

6. All PSs are to be immune of inundation from a 1% AEP event.

Applicant's Response

Response provided by DPM Water:

1. The final pump selection and operating arrangement for pump stations will be confirmed as part of the detailed design of the stations. The DPM Water report provides an overview of the general requirements of the sewage pump station to show the expected infrastructure sizing and location of the pump station. The final pump selection and operating arrangement will be confirmed and approved by TCC as part of the pump station detailed design and operational works approval.
   It is however noted that the CTM Code design standards for pump stations have the single pump capacity as being C1 x ADWF with the total pump station capacity being the greater of C1 x ADWF or 5 x ADWF. The following table shows what the single and total pump capacity would be for the two pump stations. This shows it would be very impractical (impossible) to have the pumps operating in duty/assist arrangement and meet both the single and total pump capacity requirements. When the single pump capacity flow is close to the total pump capacity flow (which is the case for PS ML07 & ML08) the normal TCC Wastewater Operations practice is to have two same size pumps operating in duty/standby. Again the pump operating arrangement will be assessed/confirmed as part of the pump station detailed design.

	PS ML08	**PS ML07**
EP	1,190	2,640
ADWF	3.2 l/s	7.03 l/s
C1	4.88	4.29
Single Pump Capacity (C1 x ADWF)	15.6 l/s	30.2 l/s
Total Pump Capacity (greater or 5 x ADWF or C1 x ADWF)	15.8 l/s	35.1 l/s
Comment	Single pump capacity and total pump capacity almost the same. Impossible to select submersible pump that could do 15.6 l/s individually and with two pumps operating together (duty/assist) to discharge anywhere near 15.8 l/s (would pump around 24 l/s combined).	Single pump capacity and total pump capacity very similar. Impossible to select submersible pump that could do 30.2 l/s individually and with two pumps operating together (duty/assist) to discharge anywhere near 35.1 l/s (would pump around 43 l/s combined).

The report already includes in a number of areas stating that the preliminary pump station design parameters will be refined/confirmed as part of the detailed design so no change/update to the report is necessary to address this RFI item.

2. The modelling of the 5 year increments for the Ridge Paddock pump stations is not viable/practical due to:

    a. The actual rate of development at Ridge Paddock is not certain so any 5 year interval assessment would just be a guesstimate and would therefore not provide any practical information to Council.

    b. Pump station ML07 discharges into a common pressure main to the Mt St John STP. This common pressure main also services all of the Northern development area (Deeragun, Burdell, Bushland Beach, Jensen, Mt Low) along with Kiran, Bohle Plains, Shaw, Mt St John, Mt Louisa etc. The only way to do an incremental assessment would be to have accurate information provided by Council on the development rates of all the other developments in the suburbs that have sewage directed along the common pressure main. Council would not have this accurate development rate information as all the other developments constantly change their actual building rates and TCC regularly changes its guesstimate of the growth rates as part of Council's review/update of its Population Growth Model etc.

    c. Council will be undertaking upgrades/duplications of the common pressure main system to Mt St John STP in the coming years. The timing for these duplications are not known as they are very much dependent on Council's annual budget so regularly don't align with the timings nominated in the LGIP. It is again impossible to do a 5 yearly incremental assessment if the timing of the other sewage infrastructure that is associated with the common pressure main system to the Mt St John STP is not certain. An example is the duplication of the DN60 common pressure main through the Bohle Industrial area (LGIP sewer item 1771) in nominated to be constructed in 2024 with the section of common pressure main through the Webb industrial land (LGIP sewer item 1526) nominated for construction in 2026. Neither of these two major sewer pressure main duplications are included in Council's upcoming capital works plan.

3. The operational volume and depth of PS ML07 has to be designed for its full development catchment. If it is sized for a smaller population then the pump station structure would be too small in the future and TCC would have to demolish it and re-build a new larger station at very high cost. The pump station structure has a 80 year design life.

    To cater for the initial lower sewage flows from the initial development stages, Townsville's Wastewater operations team would have the pump duty start level adjusted (lowered) which would therefore reduce the operational volume in the wet well. This is what is always done for new pump stations that service initial development stages. This initial reduction in the operating level and wet well operating volume reduces the sewage detention time and associated septicity and odour. The PS is also located well away from proposed lots and has a vent pole in accordance with TCC design standards so would not have odour issues to residents.

The detailed design report for the pump station and the design drawings will advise that the operating level in the wet well can be adjusted (lowered) by Council when it is only servicing the initial development stages so that septicity and odour issues don't occur.

4. Incorrect reference to Pump Station Number "ML06 instead of ML08" noted. This can be updated as part of the next round of water network analyses.

5. The DPM Water report provides an overview of the general requirements of the sewage pump station to show the expected infrastructure sizing and location of the pump station. The initial and full development duty points were assessed to determine the likely sizing (kW) of the submersible sewage pumps so that the developments power supply can be adequately designed to service the PS site. The detailed design of the pump station as associated design report will include a system resistance curve for a range of flows and operating conditions for the pump station discharging into the common pressure main. Until the detailed design of the gravity sewer system is finished and the PS ML07 detailed design is undertaken, the provision of the operating range in the planning report has no benefit as it will not be used for the pump selection. The final pump selection and operating arrangement will be confirmed and approved by TCC as part of the pump station detailed design and operational works approval. The report already includes in a number of areas the statement that the preliminary pump station design parameters will be refined/confirmed as part of the detailed design so no change/update to the report is necessary to address this RFI item.

6. PS immunity for the 1% AEP event will be provided as part of the pump station detailed design.

I trust the above responses meet with your approval and I look forward to receiving your assessment.

Please do not hesitate to contact the undersigned on TEL: 07 4725 5550 if you have any questions regarding this response.

Yours sincerely,

ANDREW WALLACE
Director
Encl.

MILFORD PLANNING

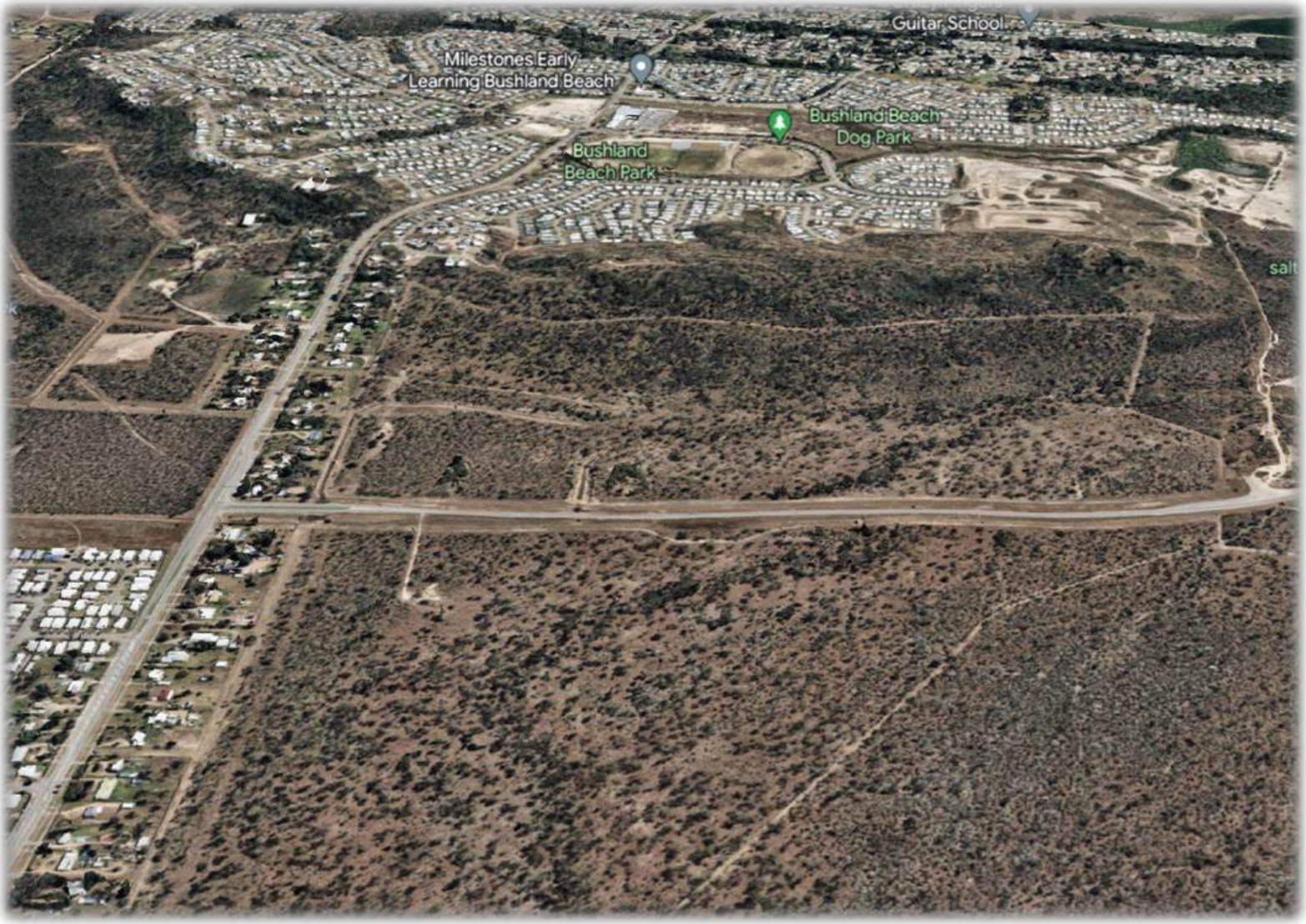
Attachment 3

Mount Low Northern Precinct

Traffic Impact Assessment

Northern Consulting Engineers

28th October 2024



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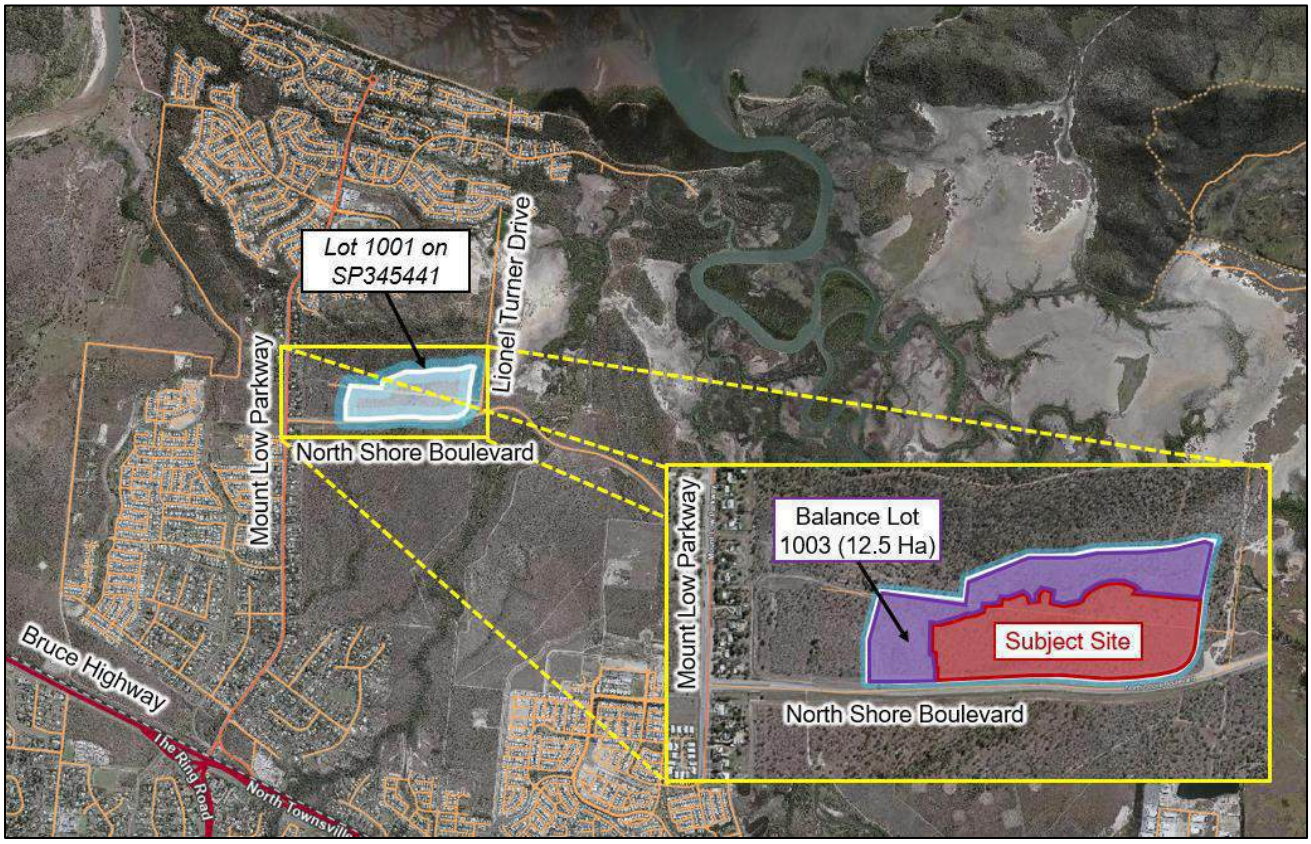
1. INTRODUCTION

1.1 Overview

Bitzios Consulting has been engaged by Northern Consulting Engineers to provide traffic engineering services in relation to a proposed residential subdivision at the Mount Low Northern Precinct Site (subject site).

The subject site is formally described as Lot 1001 on SP345441 that will be subdivided into 193 residential lots with the balance forming Lot 1003 on SP345441 with a size of approximately 12.3 hectares, as shown in Figure 1.1. The subject site is located within the Townsville City Council (Council) Local Government Area (LGA). The subject site has access via North Shore Boulevard which is connected to Mount Low Parkway and the Bruce Highway.



Source: QLD Globe

Figure 1.1: Site Location

1.2 Scope of Assessment

The scope of this Traffic Impact Assessment (TIA) included the following tasks:

- Reviewing the road network, intersection forms and alignments
- Reviewing the road hierarchy, cross sections, on-street parking provision, lot access locations, intersection locations and other road attributes (i.e., sightlines, cycle lanes) in line with Council's relevant Planning Scheme guidelines, policies and standards
- Reviewing active transport facilities and providing public transport considerations
- Reviewing refuse collection arrangements (bin locations etc.) and undertake swept path analysis using AutoTURN software

- Estimating the traffic generation and distribution for the proposed development based on the previous modelling
- Estimating the future design traffic volumes on the surrounding road network
- Undertaking SIDRA intersection analysis at the following intersection during the peak period of the year of completion
  - North Shore Boulevard / Mount Low Parkway
  - North Shore Boulevard / Road 1
  - North Shore Boulevard / Lionel Turner Drive.
- Identifying the required intersection configurations and mitigation measures that may be warranted, including timing / triggers of when these are required.

1.3 Previous Studies

Bitzios Consulting prepared the *Mt Low Master Planned Community – Interim Traffic Modelling and Impact Assessment Report* in 2018 that utilised the 2031 TSTM to create microsimulation traffic models to assess the road network requirements for the interim Mt Low development. The models, assumptions and report have been used to inform the outcomes of this proposed development.

1.4 Development Overview

The subject site is currently a greenfield site and will be cleared to facilitate the construction of the proposed development. Key development details are summarised below:

- **Yield:** 193 residential lots ranging in size from 480m^2 to 900m^2 (to be developed in 10 stages)
- **Access:** Via the Road 1 / Road 2 & 13 roundabout intersection
- **Year of Opening:** First residents living in mid-2026 with full development completion in 2027.

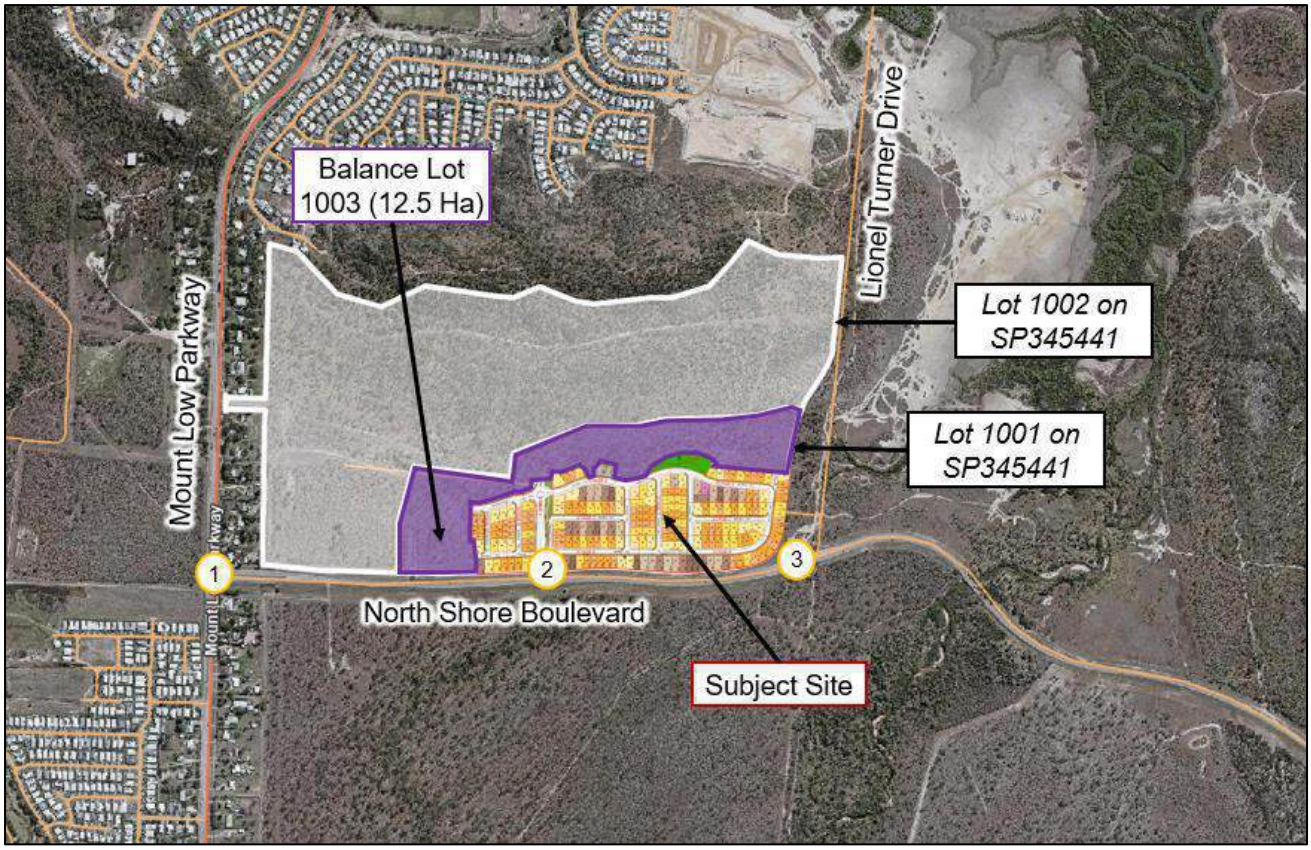
Figure 1.2 shows the proposed development. A copy of the development plans is included at **Appendix A.**

Figure 1.2: Site Plan

2. EXISTING CONDITIONS

2.1 Road Network

Figure 2.1 identifies the existing road network in proximity to the subject site.



Source: Nearmap

Figure 2.1: Road Network

Details of the road network surrounding the subject site are outlined in Table 2.1.

Table 2.1: Key Roads

Road Name	Jurisdiction	Hierarchy	Lanes	Divided	Posted Speed
North Shore Boulevard	Council	Sub-Arterial	1-lane / 2-way	Yes	80km/h
Mount Low Parkway	Council	Arterial / Sub-Arterial	2-lane / 2-way	Yes	70km/h

The key intersections to be assessed are outlined in Table 2.2.

Table 2.2: Key Intersections

ID	Intersection	Jurisdiction	Type
1	North Shore Boulevard / Mount Low Parkway	Council	Signalised
2	North Shore Boulevard / Road 1	Council	Priority-controlled[1]
3	North Shore Boulevard / Lionel Turner Drive	Council	Priority-controlled[1]

[1] *to support the proposed development*

2.2 Public Transport

The subject site is located within one (1) kilometre walking distance of the nearest bus stop pair along Mount Low Parkway. Table 2.3 summarises the relevant bus services and their frequencies during peak periods.

Table 2.3: Public Transport Services

Service	Route	Peak Frequency
233	Stockland Townsville Shopping Centre to Bushland Beach	Hourly

Consultation with TransLink may include altering Route 233 to service the proposed development via North Shore Boulevard. An ideal bus stop location may be proposed on New Road 1.

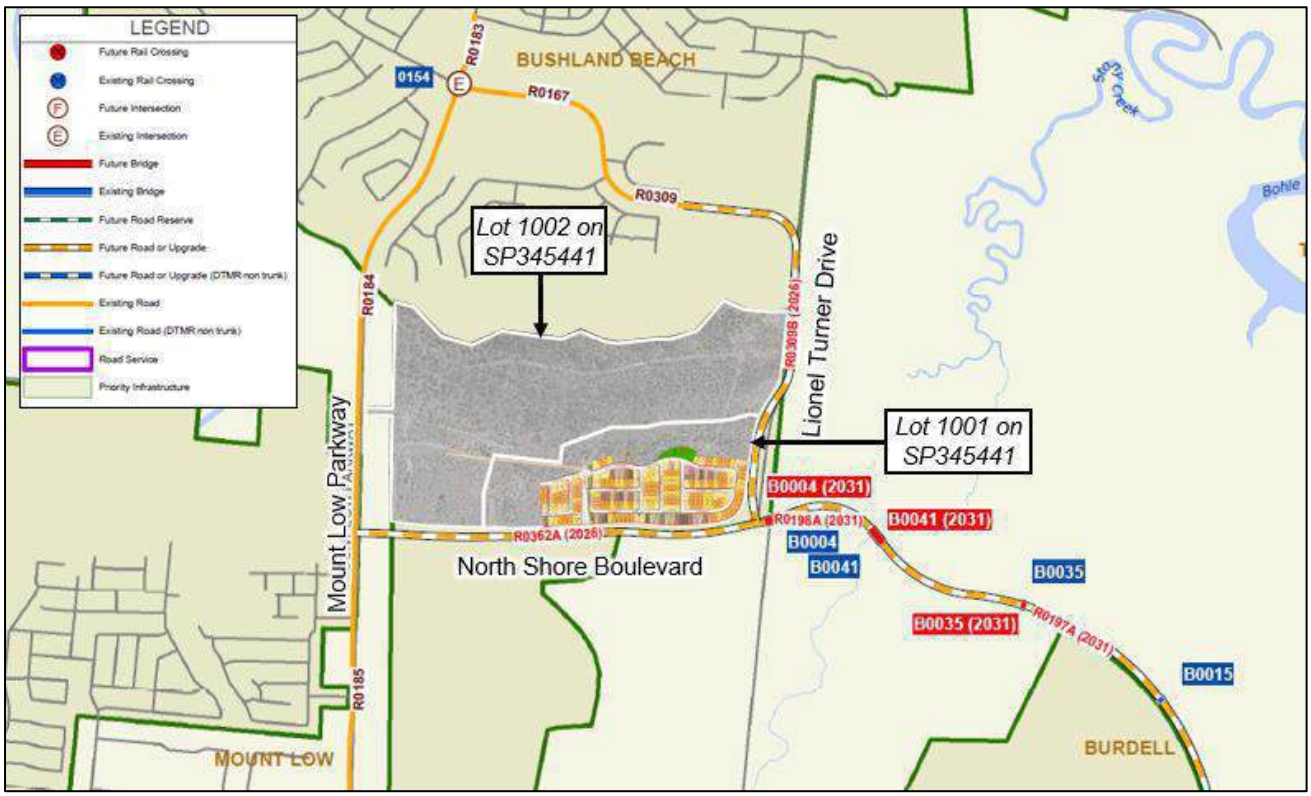
2.3 Local Government Infrastructure Plan

A review of Council's Local Government Infrastructure Plan (LGIP) maps shows planned upgrades to the existing road and pathways within vicinity of the subject site. This included transportation roads and pathways.

2.3.1 Transportation Roads

The LGIP identified North Shore Boulevard (RA0362A (2026)) and Lionel Turner Drive (R0309B (2026)) as 'future roads or upgrades' to be constructed by 2026, as shown in Figure 2.2. Lionel Turner Drive will be extended to connect to North Shore Boulevard to form a T-intersection.

Council have confirmed that the Lionel Turner Drive upgrade is on schedule, however, the North Shore Boulevard upgrade has been delayed and not planned until after 2041. Therefore, only the Lionel Turner Drive connection will be constructed prior to the year of opening of the full development in 2027.

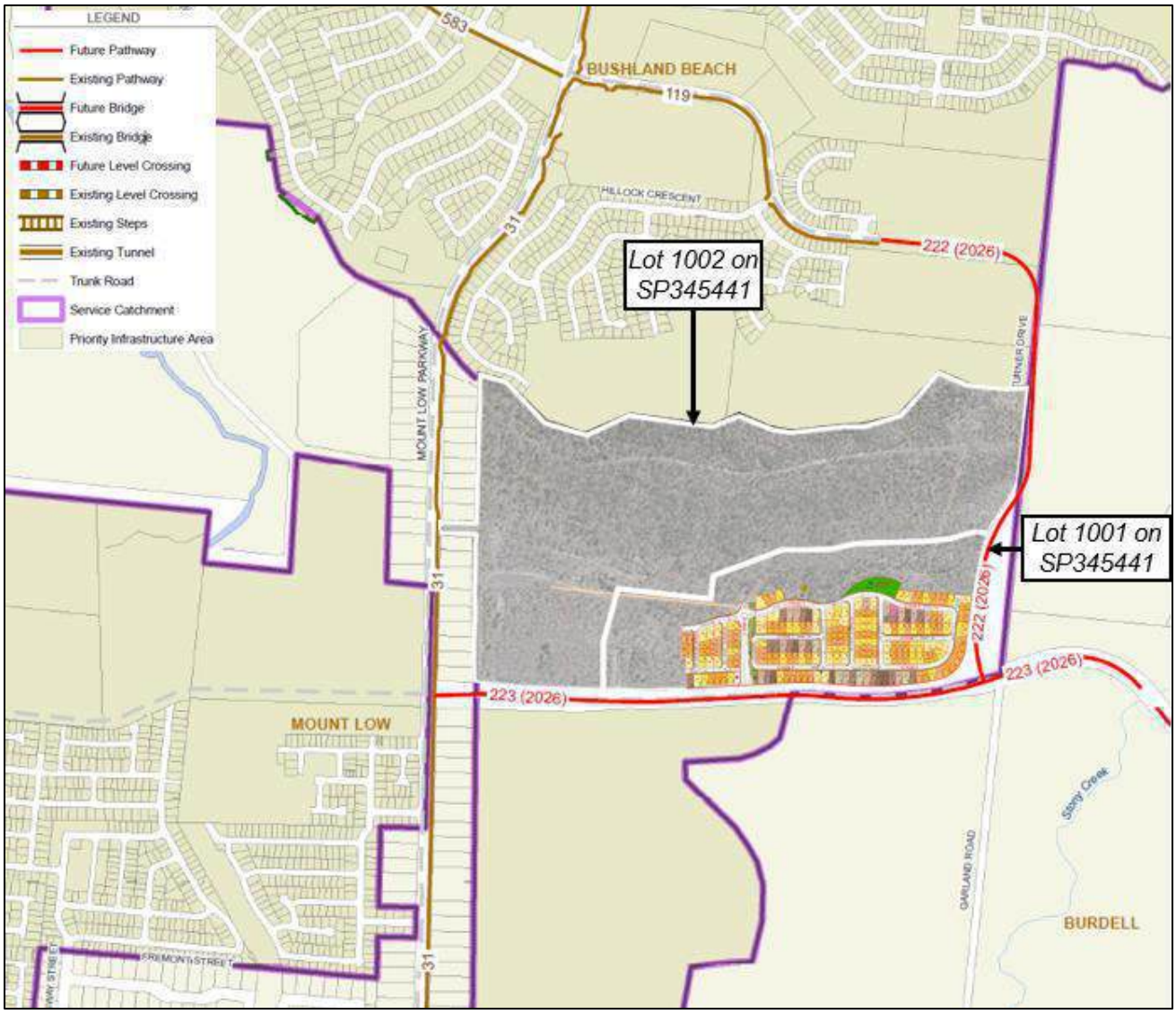


Source: Council's City Plan (Version 2022/02)

Figure 2.2: LGIP – Transportation Roads

2.3.2 Transportation Pathways

The subject site is located within a developing urban area and as such it is expected that the surrounding active transport network will improve as development continues. The LGIP also identified North Shore Boulevard (223 (2026)) and Lionel Turner Drive (222 (2026)) as 'future pathways' which coincide with the future roads, as shown in Figure 2.3.



Source: Council's City Plan (Version 2022/02)

Figure 2.3: LGIP – Transportation Pathways

3. SITE LAYOUT ASSESSMENT

3.1 Site Access

Vehicular access to the proposed 193 lots is via the Road 1 / Road 2 / Road 13 roundabout. Road 1 forms the northern approach to the North Shore Boulevard intersection, as shown in Figure 3.1.

Figure 3.1: Proposed Site Access

3.2 Balance of Developments

As outlined in the previous report (*Mt Low Master Planned Community – Interim Traffic Modelling and Impact Assessment Report, 2018)*, further development is planned to the north of the proposed development comprising of 633 lots and will have access via the Road 1 / Road 2 / Road 13 roundabout. The remaining lots will have a balance land comprising of Lots 1001 and 1002 on SP345441. These developments are shown in Figure 3.2.

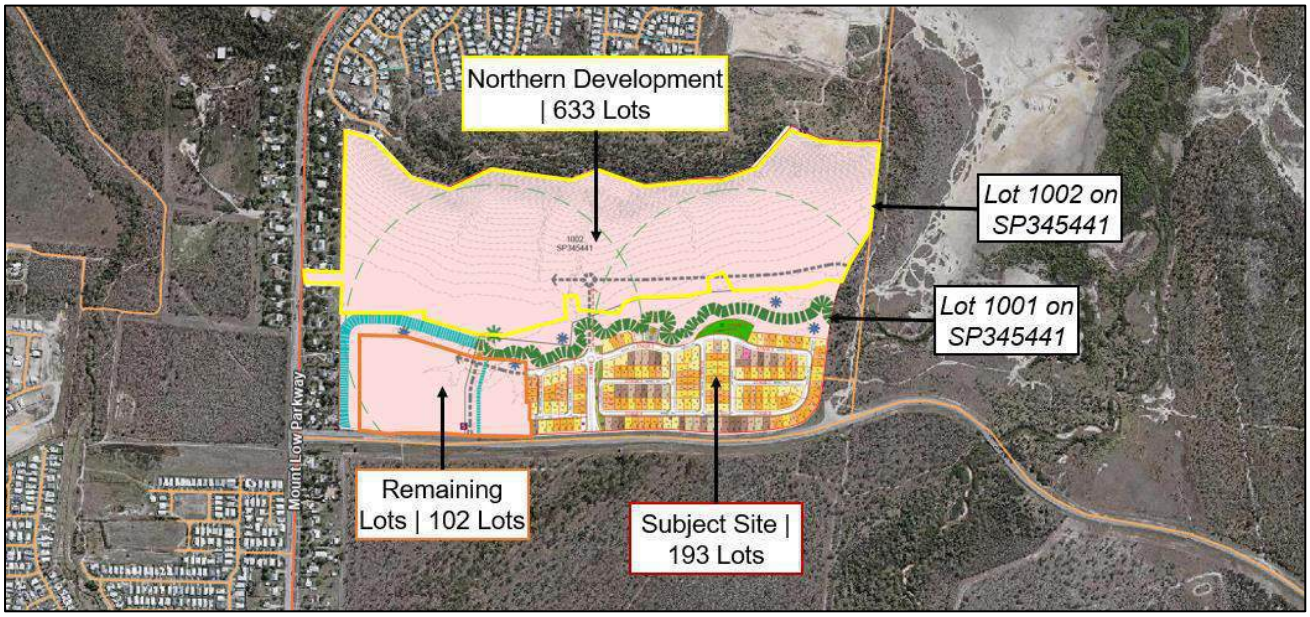


Figure 3.2: Development Overview North of North Shore Boulevard

Based on the above, Road 1 will need to be appropriately designed based on the expected traffic generation from all these proposed developments including the future development.

3.3 Road Hierarchy

A review has been undertaken to confirm all roads have been designed with suitable capacity to accommodate ultimate traffic volumes. Table 3.1 provides a summary of the relevant road cross sections as per Council's Standard Drawings (SD-001 Version D).

Table 3.1: Road Cross Sections

Hierarchy	Road Reserve	Traffic Volumes	Pavement Width	Verge Width	Footpath
Major Collector	typically 25.6m to 35.0m	<12,000 daily trips	16.3-16.4m	4-6m	1.5m and 2.5m
Minor Collector Street	typically 21.0m	<3,000 daily trips	11.8m	4m	1.5m
Access Street	typically 16.6m	<750 daily trips	7.4m	4m	1.5m on one side
Access Place	typically 14.6m	<150 daily trips	5.4m	4m	1.5m on one side

Noting the above, Northern Consulting Engineers have developed alternative road cross sections for this particular development that accord with Council's standards. These have been provided at **Appendix B**. Using daily traffic generation, Table 3.2 summarises the required and proposed road hierarchy.

Table 3.2: Road Hierarchy

Road	Required Hierarchy	Proposed Road Reserve	Alternative Road Cross Section Requirement	Compliant
1[1]	Major Collector Street	*varies*	*varies*	Yes[2]
2	Minor Collector Street	21.0m	21.0m	Yes
3	Access Street Modified	15.5m	15.5m	Yes
4	Access Street	16.6m	16.6m	Yes
5	Access Street	16.6m	16.6m	Yes
6	Access Place Modified	11.5m	11.5m	Yes
7	Access Street	16.6m	16.6m	Yes
8	Access Street	16.6m	16.6m	Yes
9	Access Street	16.6m	16.6m	Yes
10	Access Street	16.6m	16.6m	Yes
11	Access Street	16.6m	16.6m	Yes
12	Access Street	16.6m	16.6m	Yes
13	Minor Collector Street Modified	20.4m	20.4m	Yes
14	Access Street	16.6m	16.6m	Yes
15	Access Street	16.6m	16.6m	Yes
16	Access Street	16.6m	16.6m	Yes

[1] includes the proposed development (193 lots), northern development (633 lots) and the remaining lots (102 lots)
[2] to be designed as per Council's Standard Drawing for a Major Collector that includes provision for a bus stop

As per Council's standard drawings, a Major Collector Street will provide provision for bus stops making Road 1 a suitable location for bus routes to be diverted. In summary, the proposed road widths and hierarchy complies with Council's requirements and is considered suitable from a traffic engineering perspective.

3.4 Sight Distance

3.4.1 Overview

A review against Safe Intersection Sight Distance (SISD) requirements has been undertaken at the proposed internal intersections in accordance with Austroads *Guide to Road Design Part 4a* (GTRD4a) (2021).

3.4.2 North Shore Boulevard

Table 3.3 summarises our review of the SISD expected to be available against GTRD.

Table 3.3: Driveway Sight Distance Review

Speed Environment	Direction	Required SISD	Available Sight Distance	Compliant
80km/h	Eastbound	181m	>200m	Yes
	Westbound		~200m	Yes

3.4.3 Internal Roads

It is noted the minimum sight distance requirement is 97m for a posted speed of 50km/h. The majority of intersections along the Minor Collector Streets achieved the minimum sight distance requirement. It is noted the New Road 13 / New Road 14 intersection does not achieve the minimum sight distance requirement. This is considered acceptable noting vehicles exiting the roundabout to the east will be travelling at lower speeds.

3.4.4 Summary

In summary, the North Shore Boulevard intersection and most internal intersections provide sufficient SISD and are considered acceptable from a traffic engineering perspective.

3.5 Lot Access Locations

Lots located on the corner of an intersection are required to have their driveway access located on the minor road of an intersection and located as far from the intersection as possible.

The access driveways to rear lots were assessed and swept paths show a vehicle can successfully enter / exit the driveways. These swept path diagrams have been provided at **Appendix C**. Typically, these accesses would have easements over them leading to the rear lots.

3.6 Street Lengths / Site Layout

The internal road lengths have been designed in accordance with publications such as the Institute of Public Works Engineering Australasia's (IPWEA) '*Complete Streets*' to ensure that vehicle speeds are managed. Complete Streets nominates a maximum and desirable street length based on the road speed which are reproduced below:

- Maximum Street Length: 175m
- Desirable Street Length: 150m.

The subject site includes roads exceeding 175m in length and as such, Local Area Traffic Management (LATM) treatments are usually warranted. However, according to Section 2b(vii) of *Schedule 6.4.6.1 – Geometric Road Design* of Councils City Plan, LATM devices are considered unnecessary for appropriately designed new streets and should only be used where no other solution is viable.

The proposed development has been appropriately designed with the internal road hierarchy adhering to Council's standards. Additionally, the subject site has made provisions for future access connections to the future development to the north and west with a northern leg at the New Road 1 / Road 2 / Road 13 roundabout and opportunities to extend on Road 13 and Road 16. The proposed development did not include four-way intersections as part of the development and priority T-intersections are all proposed with >40m separation as per IPWEA's '*Street Design Manual*'.

Given the above, we are of the view that the internal layout complies with Council requirements.

3.7 Servicing

All internal roads have been designed to alternative road cross sections that accord with Council's standards and therefore are expected to be suitable to accommodate a Refuse Collection Vehicle (RCV) in accordance with Section 3 of *Schedule 6.4.5.4 – Car Parking)* of Council's City Plan.

Kerbside refuse collection is assumed to service the dwellings using Council's RCV.

The shared access driveway fronting lots 129-133 has been designed to allow Council's RCV. Swept paths showing an RCV can successfully enter / exit the shared access driveway in a forward motion has been provided at **Appendix C**.

Common collection refuse points can be proposed for lots that have access via the access driveways as listed below and shown in Figure 3.3.

- Lot 152, 153, 154 | Adjacent to Lot 155
- Lot 171, 172 | Adjacent to Lot 170.

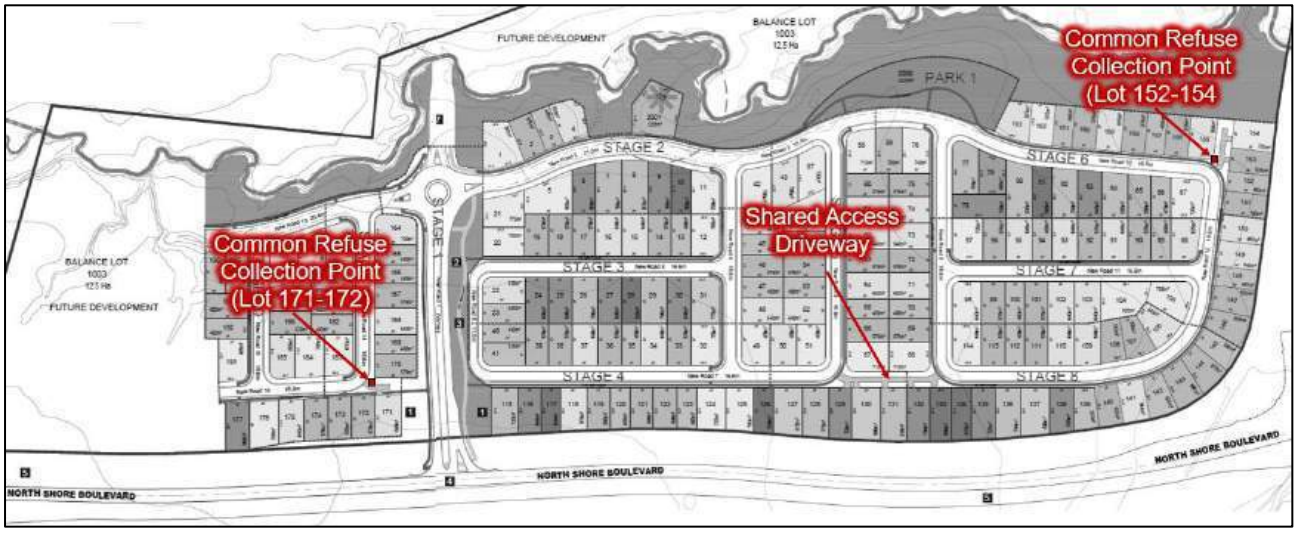


Figure 3.3: Common Refuse Collection Points

4. TRAFFIC ASSESSMENT

4.1 Background Traffic

The Aimsun model from the previous study was used to determine the background traffic. It is understood the previous study has been prepared over the past decade for this development and has been largely accepted by Council.

Volumes were extracted and used for the following key intersections:

- North Shore Boulevard / Mount Low Parkway
- North Shore Boulevard / Road 1
- Mount Low Parkway / Lionel Turner Drive.

4.2 Traffic Distribution

The Aimsun model from the previous study was also used to determine the traffic distribution. Each intersection was modelled individually, as such a network diagram illustrating the peak hour traffic volumes are provided at **Appendix D**.

It was assumed that 80% of trips are to / from the south (i.e. Central Townsville), whilst the remaining 20% of trips are to / from the north (i.e. Bushland Beach).

4.3 Design Traffic

4.3.1 Development Traffic Generation

According to Council's Planning Scheme, the subject site is located within an "Urban area". The daily trip generation rate for a residential component of dwellings in Urban areas are 10 vehicles per day per dwelling. Table 4.1 provides a summary of the adopted trip generation rate and net increase in trips for the proposed development.

Table 4.1: Development Traffic Generation

Land Use	Quantity	Trip Generation Rate (per dwelling)			Trips (veh)		
		AM	PM	Daily	AM	PM	Daily
Dwelling House	193 dwellings	0.71	0.78	10	**(+) 138**	**(+) 151**	**(+) 1,930**

The proposed development is estimated to result in an increase of 138 trips in the AM, and 151 trips in the PM peak hours as well as 1,930 daily trips. Under uniform flow, the increase in traffic equates to approximately less than three (3) additional trips every minute in the AM and PM peak hour.

4.3.2 Development Trip Directionality and Distribution

A typical residential 'IN:OUT' split was adopted for this assessment to estimate the distribution of the development traffic onto the surrounding road network. The adopted 'IN:OUT' splits for the development and the estimated distribution are summarised in Table 4.2.

Table 4.2: Development Trip Directionality and Distribution

Land Use	AM Peak		PM Peak	
	Inbound	Outbound	Inbound	Outbound
Dwelling House	20%	80%	70%	30%
	28	**110**	**106**	**46**

4.4 Intersection Assessment

4.4.1 Overview

SIDRA Intersection 9.1 (SIDRA) software was used to determine the impact of development trips on the surrounding road network. The key intersections assessed are as follows:

- North Shore Boulevard / Mount Low Parkway
- North Shore Boulevard / Road 1
- Mount Low Parkway / Lionel Turner Drive.

The assessment was undertaken for the weekday AM and PM peak hours. Detailed SIDRA outputs for with the development scenarios at the expected year of opening (2027) are provided at **Appendix E**.

The previous study identified intersection layouts for the abovementioned intersections based on the assumed Ultimate level of development in the Mount Low region. Based on this, the North Shore Boulevard / Mount Low Parkway intersection was assessed in the existing layout and the Ultimate layout. The North Shore Boulevard / Road 1 and Mount Low Parkway / Lionel Turner Drive intersections were firstly assessed as an unsignalised layout detailing what was required with the proposed development, and in the Ultimate layout based on the previous modelling assumptions.

The Department of Transport and Main Roads (TMR's) Road Safety Policy (2018) requires pedestrian crossings to be provided on all approaches at signalised intersections. Pedestrian data was not available for the signalised intersections. It was therefore assumed that there were 30 pedestrians per hour for each pedestrian movement for each signalised intersection. This meant that pedestrian movements were called once per intersection cycle which is likely an overestimate.

4.4.2 Intersection Level of Service

Table 4.3 details the intersection Level of Service (LOS) thresholds used by SIDRA which are directly related to the average delay in seconds per vehicle.

Table 4.3: Level of Service Criteria

Level of Service	Average Delay per Vehicle (d)	
	Signals	Sign Control
A	d ≤ 10	d ≤ 10
B	10 < d ≤ 20	10 < d ≤ 15
C	20 < d ≤ 35	15 < d ≤ 25
D	35 < d ≤ 55	25 < d ≤ 35
E	55 < d ≤ 80	35 < d ≤ 50
F	80 < d	50 < d

SOURCE: SIDRA Intersection 9.1 User Guide – Delay (SIDRA)

For traffic signals, the average movement delay and LoS over all movements will be taken, while for roundabouts and sign-controlled intersections, the LoS assessment will be based the highest delay movement. As per TMR's Guide to Traffic Impact Assessment (GTIA), a priority controlled intersection or roundabout should be upgraded for safety reasons if the average peak hour delays for any turn movement exceeds 42 seconds (i.e. LOS C).

4.4.3 North Shore Boulevard / Mount Low Parkway Intersection – Existing Layout

The current and ultimate layouts of the North Shore Boulevard / Mount Low Parkway intersection are shown in Figure 4.1 and Figure 4.2, respectively. The ultimate layout was based on the previous modelling assumptions.

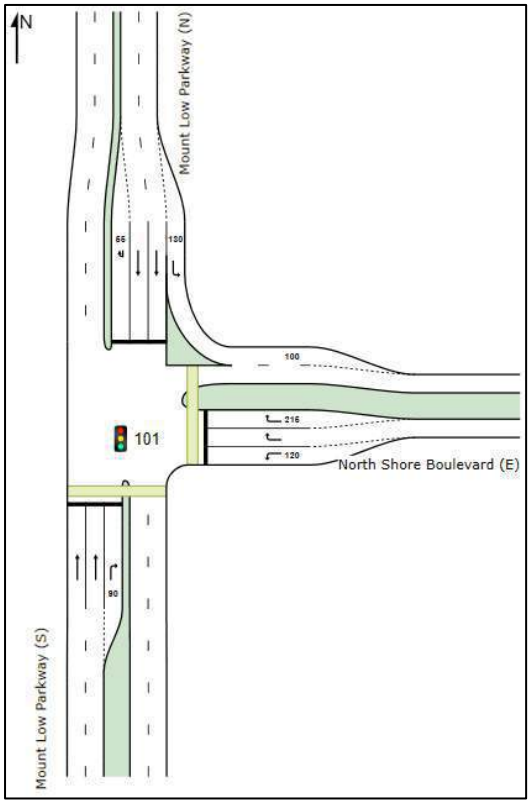


Figure 4.1: North Shore Boulevard / Mount Low Parkway | Existing SIDRA Layout

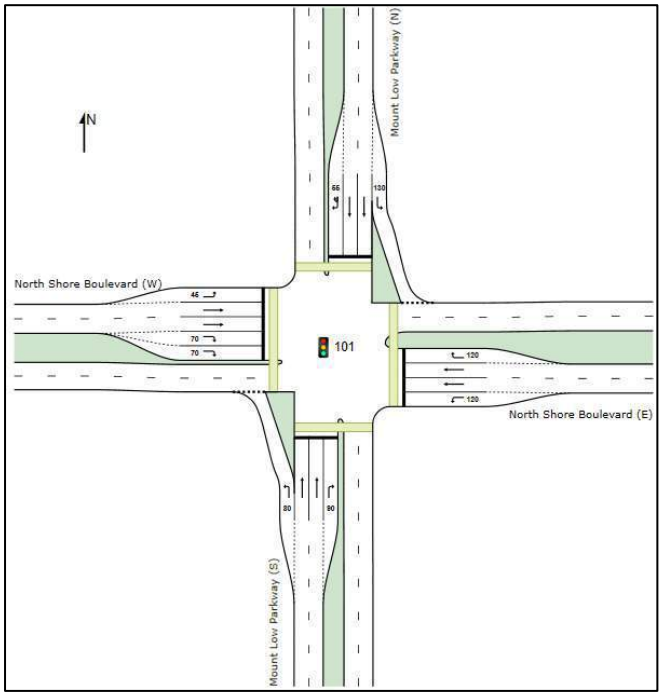


Figure 4.2: North Shore Boulevard / Mount Low Parkway | Ultimate SIDRA Layout

The signal phasing used for the North Shore Boulevard / Mount Low Parkway intersection in the existing and ultimate layouts are shown in Figure 4.3.

Top: Current Layout / Bottom: Ultimate Layout (According to previous modelling)

Figure 4.3: North Shore Boulevard / Mount Low Parkway | Ultimate SIDRA Signal Layout

Table 4.4 summarises the SIDRA results for the existing and proposed North Shore Boulevard / Mount Low Parkway intersection layouts for the AM and PM peak hours.

Table 4.4: North Shore Boulevard / Mount Low Parkway SIDRA Results Summary

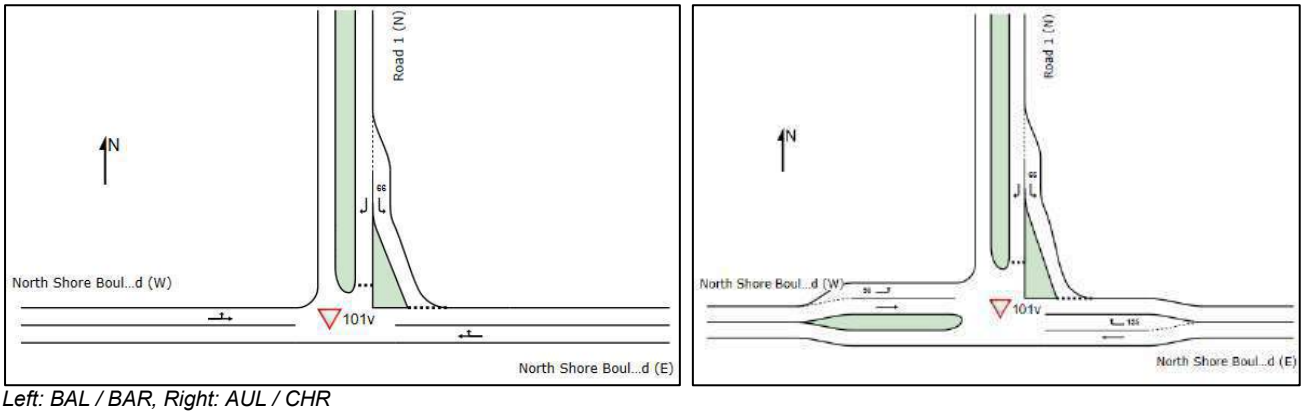
Approach	Lane	2027 AM Peak					2027 PM Peak				
		Vol	DOS (v/c)	Delay (sec)	LOS	Queue (m)	Vol	DOS (v/c)	Delay (sec)	LOS	Queue (m)
3-way Signalised Intersection (Existing)											
South	T	122	0.05	6.5	LOS A	8	346	0.13	6.9	LOS A	25
	R	71	0.17	46.2	LOS D	24	110	0.14	29.0	LOS C	28
East	L	124	0.17	31.7	LOS C	34	72	0.07	18.0	LOS B	13
	R	3	0.01	55.7	LOS E	1	9	0.02	56.2	LOS E	2
North	L	8	0.00	6.8	LOS A	0	4	0.00	6.9	LOS A	0
	T	320	0.17	18.5	LOS B	38	159	0.14	33.5	LOS C	25
	U	1	0.02	68.8	LOS E	0	1	0.02	68.8	LOS E	0
TOTAL		**649**	**0.17**	**21.9**	**LOS C**	**38**	**701**	**0.14**	**18.3**	**LOS B**	**28**
4-way Signalised Intersection (Ultimate)											
South	L	1	0.00	5.9	LOS A	0	1	0.00	6.0	LOS A	0
	T	122	0.07	21.0	LOS C	15	346	0.18	18.0	LOS B	41
	R	71	0.25	55.1	LOS E	27	110	0.19	38.6	LOS D	34
East	L	124	0.26	44.3	LOS D	42	72	0.19	49.4	LOS D	26
	T	1	0.00	33.6	LOS C	0	1	0.00	39.4	LOS D	0
	R	3	0.01	58.1	LOS E	1	9	0.09	67.7	LOS E	4
North	L	8	0.01	7.2	LOS A	0	4	0.00	7.3	LOS A	0
	T	320	0.26	31.9	LOS C	50	159	0.19	40.5	LOS D	28
	R	1	0.02	65.2	LOS E	1	1	0.03	66.8	LOS E	1
	U	1	0.02	67.2	LOS E	1	1	0.03	68.8	LOS E	1
West[1]	L	1	0.00	44.4	LOS D	0	1	0.00	44.4	LOS D	0
	T	1	0.00	38.6	LOS D	0	1	0.00	38.6	LOS D	0
	R	1	0.01	65.3	LOS E	0	1	0.01	65.3	LOS E	0
TOTAL		**655**	**0.26**	**34.7**	**LOS C**	**50**	**707**	**0.19**	**30.3**	**LOS C**	**41**

[1]No volumes were assumed on this approach, however, SIDRA requires at least one (1) vehicle

As shown, the North Shore Boulevard / Mount Low Parkway intersection is expected to operate within acceptable performance limits (DOS < 0.9) for a signalised intersection at the expected year of opening (2027) with the proposed 193 lots in the existing and ultimate intersection layouts.

4.4.4 North Shore Boulevard / Road 1 Intersection

The unsignalised and ultimate layouts of the North Shore Boulevard / Road 1 intersection are shown in Figure 4.4 and Figure 4.5, respectively. The turn warrant assessment showed only a BAL / BAR are required for the proposed development, however, an assessment for an AUL / CHR was also conducted as an alternative option. The ultimate layout was based on the previous modelling assumptions.



Left: BAL / BAR, Right: AUL / CHR

Figure 4.4: North Shore Boulevard / Road 1 | Priority Controlled Layout

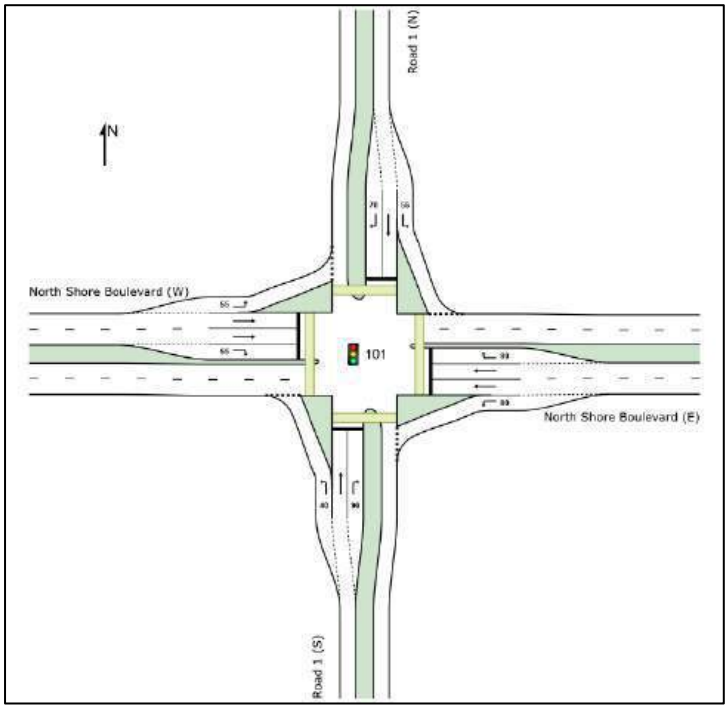


Figure 4.5: North Shore Boulevard / Road 1 | Ultimate SIDRA Layout

A copy of the turn warrants assessment graph is included at **Appendix F**.

The signal phasing used for the ultimate signalised intersection is shown in Figure 4.6.

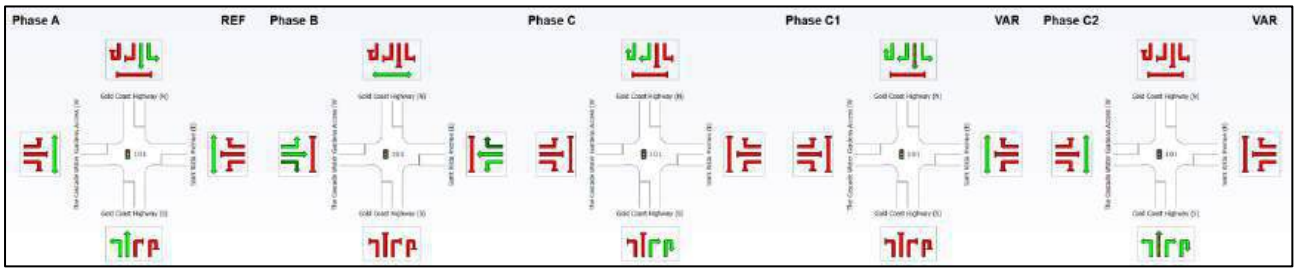


Figure 4.6: North Shore Boulevard / Road 1 | Ultimate SIDRA Signal Layout

Table 4.5 summarises the SIDRA results for the North Shore Boulevard / Road 1 intersection for the AM and PM peak hours.

Table 4.5: North Shore Boulevard / Road 1 SIDRA Results Summary

Approach	Lane	2027 AM Peak					2027 PM Peak				
		Vol	DOS (v/c)	Delay (sec)	LOS	Queue (m)	Vol	DOS (v/c)	Delay (sec)	LOS	Queue (m)
3-way Priority-Controlled (BAL / BAR)											
East	T	45	0.03	0.0	LOS A	0	58	0.06	0.2	LOS A	2
	R	5	0.03	7.4	LOS A	0	38	0.06	7.6	LOS A	2
North	L	27	0.02	4.8	LOS A	1	9	0.01	4.7	LOS A	0
	R	83	0.08	5.1	LOS A	2	37	0.04	5.3	LOS A	1
West	L	23	0.05	7.0	LOS A	0	68	0.07	7.0	LOS A	0
	T	77	0.05	0.0	LOS A	0	57	0.07	0.0	LOS A	0
TOTAL		**260**	**0.08**	**7.4**	**LOS A**	**2**	**267**	**0.07**	**7.6**	**LOS A**	**2**
3-way Priority-Controlled (AUL / CHR)											
East	T	45	0.02	0.0	LOS A	0	58	0.03	0.0	LOS A	0
	R	5	0.00	7.5	LOS A	0	38	0.03	7.6	LOS A	1
North	L	27	0.02	4.8	LOS A	1	9	0.01	4.7	LOS A	0
	R	83	0.09	5.6	LOS A	3	37	0.04	5.9	LOS A	1
West	L	23	0.01	7.0	LOS A	0	68	0.04	7.0	LOS A	0
	T	77	0.04	0.0	LOS A	0	57	0.03	0.0	LOS A	0
TOTAL		**260**	**0.09**	**7.5**	**LOS A**	**3**	**267**	**0.04**	**7.6**	**LOS A**	**1**
4-way Signalised Intersection (Ultimate)											
South[1]	L	1	0.00	5.2	LOS A	0	1	0.00	5.1	LOS A	0
	T	1	0.00	50.1	LOS D	0	1	0.00	50.1	LOS D	0
	R	1	0.00	27.7	LOS C	0	1	0.00	39.2	LOS D	0
East	L	1	0.00	7.7	LOS A	0	1	0.00	7.7	LOS A	0
	T	45	0.10	37.8	LOS D	15	58	0.08	25.6	LOS C	16
	R	5	0.01	30.6	LOS C	1	38	0.07	39.3	LOS D	12
North	L	27	0.02	5.1	LOS A	1	9	0.01	5.0	LOS A	0
	T	1	0.00	50.1	LOS D	0	1	0.00	50.1	LOS D	0
	R	83	0.12	29.2	LOS C	22	37	0.08	40.6	LOS D	12
West	L	23	0.02	7.7	LOS A	1	68	0.05	7.8	LOS A	2
	T	77	0.12	28.8	LOS C	22	57	0.07	20.9	LOS C	14
	R	1	0.01	67.4	LOS E	0	1	0.01	67.4	LOS E	0
TOTAL		**266**	**0.12**	**26.4**	**LOS C**	**22**	**273**	**0.08**	**23.7**	**LOS C**	**16**

[1]No volumes were assumed on this approach, however, SIDRA requires at least one (1) vehicle

As shown, the North Shore Boulevard / Road 1 intersection is expected to operate well within acceptable performance limits (DOS < 0.9) under the BAL / BAR configuration at the expected year of opening in 2027 with the proposed 193 lots. As expected, it also operates satisfactorily under the AUL / CHR configuration which is a suitable alternative option. Preliminary investigation showed the AUL / CHR configuration is capable of servicing the full northern development (928 lots) as per Figure 3.2. However, further investigation would be required. Lastly, the intersection operates satisfactorily as a 4-way signalised intersection (ultimate).

4.4.5 North Shore Boulevard / Lionel Turner Drive Intersection

The unsignalised and ultimate layouts of the North Shore Boulevard / Lionel Turner Drive intersection are shown in Figure 4.7 to Figure 4.9. It is understood that the intersection will be initially unsignalised that will be later upgraded to signals. The turn warrant assessment showed a BAL and CHR are required for this intersection The ultimate layout was based on the previous modelling assumptions.

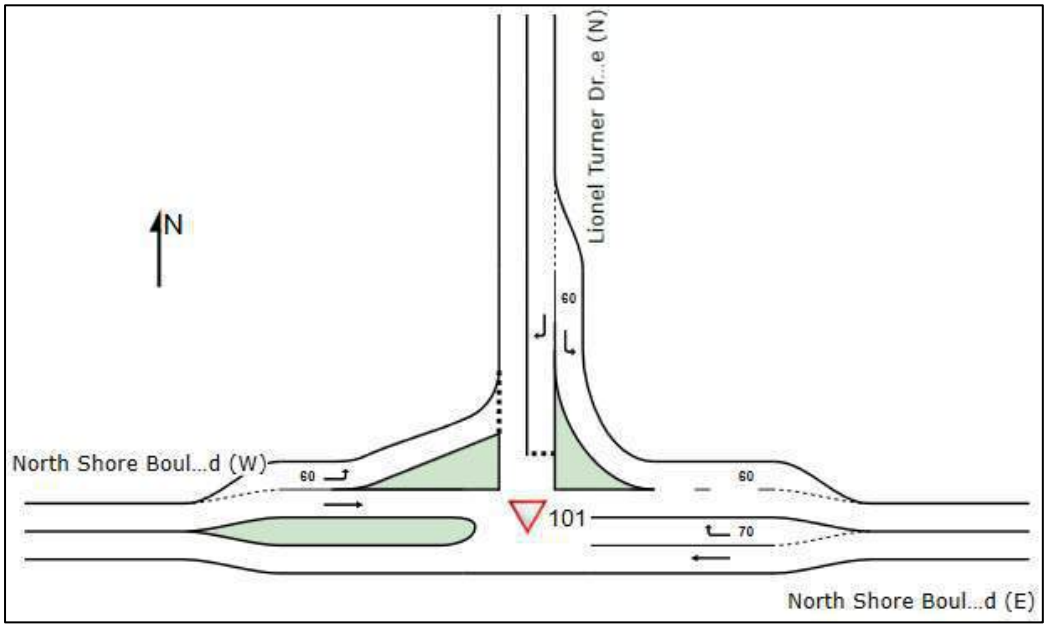


Figure 4.7: North Shore Boulevard / Lionel Turner Drive | Priority-Controlled SIDRA Layout

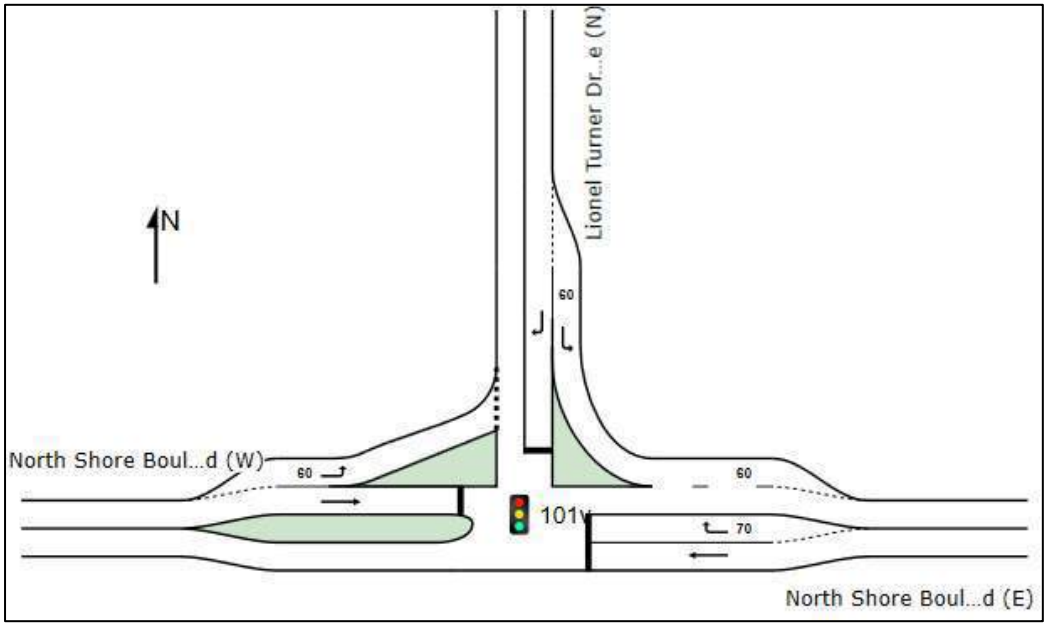


Figure 4.8: North Shore Boulevard / Lionel Turner Drive | Signalised SIDRA Layout

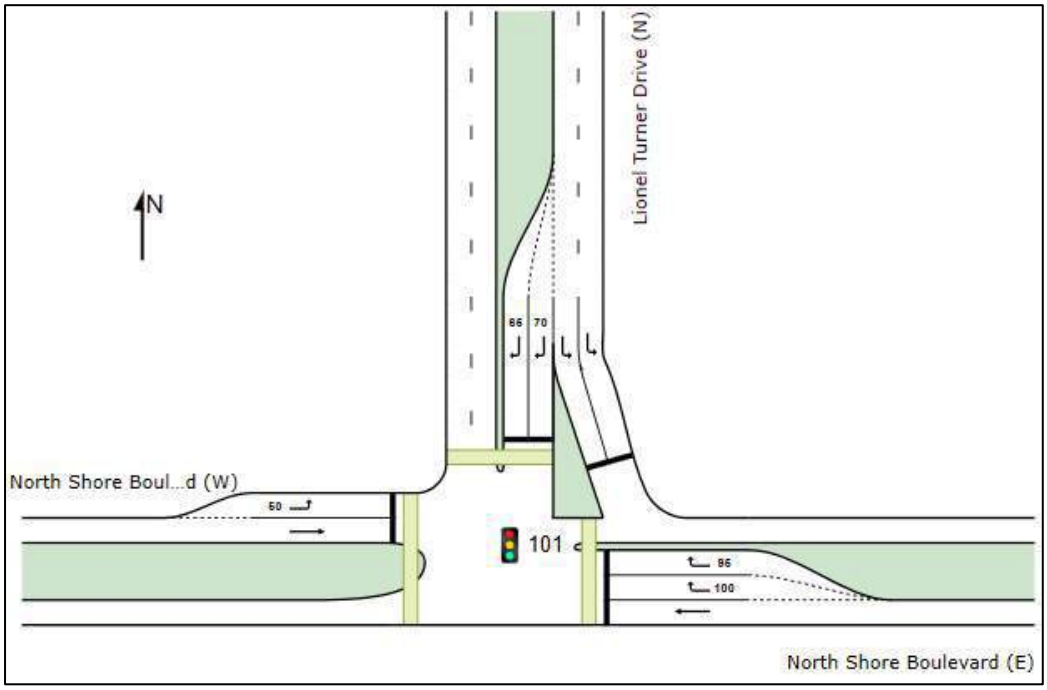
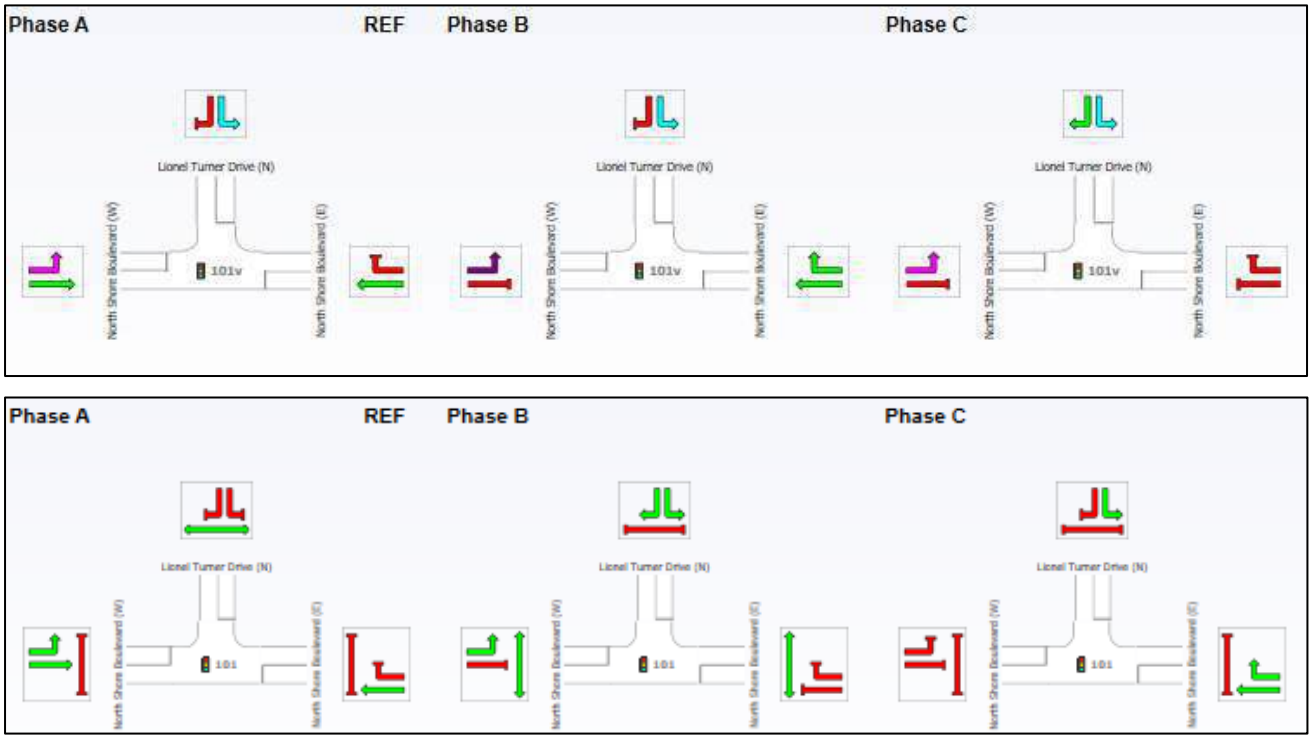


Figure 4.9: North Shore Boulevard / Lionel Turner Drive | Ultimate SIDRA Layout

A copy of the turn warrants assessment graph is included at **Appendix F**.

The signal phasing used for the signalised intersections are shown in Figure 4.10.



Top: Signalised Layout / Bottom: Ultimate Layout (According to previous modelling)

Figure 4.10: North Shore Boulevard / Lionel Turner Drive | SIDRA Signal Layout

Table 4.6 summarises the SIDRA results for the North Shore Boulevard / Lionel Turner Drive intersection as a priority-controlled intersection and a signalised intersection for the AM and PM peak hours.

Table 4.6: North Shore Boulevard / Lionel Turner Drive SIDRA Results Summary

Approach	Lane	2027 AM Peak					2027 PM Peak				
		Vol	DOS (v/c)	Delay (sec)	LOS	Queue (m)	Vol	DOS (v/c)	Delay (sec)	LOS	Queue (m)
Priority-Controlled											
East	T	52	0.03	0.0	LOS A	0	92	0.05	0.0	LOS A	0
	R	200	0.13	5.9	LOS A	4	725	0.44	5.9	LOS A	22
North	L	622	0.43	6.2	LOS A	19	255	0.17	5.9	LOS A	6
	R	1	0.00	7.7	LOS A	0	4	0.01	15.9	LOS C	0
West	L	1	0.06	5.6	LOS A	0	2	0.04	5.6	LOS A	0
	T	103	0.06	0.0	LOS A	0	64	0.04	0.0	LOS A	0
TOTAL		**979**	**0.43**	**7.7**	**LOS A**	**19**	**1,142**	**0.44**	**15.9**	**LOS C**	**22**
Signalised Intersection											
East	T	52	0.05	4.5	LOS A	3	92	0.07	3.6	LOS A	6
	R	200	0.44	20.1	LOS C	26	725	0.81	23.8	LOS C	149
North	L	622	0.34	6.0	LOS A	0	255	0.14	5.8	LOS A	0
	R	1	0.00	21.6	LOS C	0	4	0.02	33.0	LOS C	1
West	L	1	0.00	7.2	LOS A	0	2	0.00	12.0	LOS B	0
	T	103	0.36	17.8	LOS B	14	64	0.34	29.2	LOS C	14
TOTAL		**979**	**0.44**	**10.1**	**LOS B**	**26**	**1,142**	**0.81**	**18.5**	**LOS B**	**149**
Signalised Intersection (Ultimate)											
East	T	52	0.04	4.6	LOS A	6	92	0.07	4.7	LOS A	11
	R	200	0.10	19.7	LOS B	20	725	0.35	20.6	LOS C	83
North	L	622	0.38	10.6	LOS B	73	255	0.15	8.9	LOS A	22
	R	1	0.00	49.7	LOS D	0	4	0.01	50.1	LOS D	1
West	L	1	0.00	31.3	LOS C	0	2	0.00	33.5	LOS C	1
	T	103	0.38	51.4	LOS D	41	64	0.29	53.5	LOS D	26
TOTAL		**979**	**0.38**	**16.5**	**LOS B**	**73**	**1,142**	**0.35**	**18.7**	**LOS B**	**83**

As shown, the North Shore Boulevard / Lionel Turner Drive intersection is expected to operate within acceptable performance limits (DOS < 0.9) as a priority-controlled intersection and the upgrade to signals at the expected year of opening (2027) with the proposed 193 lots. It also shows to work satisfactorily in the ultimate configuration as a signalised intersection.

5. SUMMARY

The key findings from this Traffic Impact Assessment for the proposed development are summarised below:

- A residential subdivision development is proposed at the Mount Low Northern Precinct Site
- The proposed development includes 193 residential lots with an expected year of opening of 2027
- The LGIP identified North Shore Boulevard (RA0362A (2026)) and Lionel Turner Drive (R0309B (2026) as 'future roads or upgrades'
- Council has confirmed that the Lionel Turner Drive upgrade is on schedule, however, the North Shore Boulevard upgrade has been delayed and not planned until after 2041
- The LGIP identified North Shore Boulevard (223 (2026)) and Lionel Turner Drive (222 (2026)) as 'future pathways' which coincide with the future roads
- Access to the site is provided via a new roundabout intersection at the Road 1 / Road 2 / Road 13 intersection with Road 1 forming the northern approach to the North Shore Boulevard intersection
- All internal road corridors, road hierarchies, intersections, and servicing provisions are to be designed in accordance with Council's requirements
- Road 1 will be required to be designed as a Major Collector Street based on the daily traffic generation from the proposed development (193 lots), northern development (633 lots) and the remaining lots (102 lots). It will be a suitable location for a bus stop provided it will be designed as a Major Collector Street
- Swept path diagrams confirm vehicles can successfully enter / exit the proposed access driveways to rear lots
- The shared access driveway fronting lots 129-133 has been designed to allow Council's RCV
- Common collection refuse points are recommended to service Lots 152-154 and Lots 171-172
- The proposed development is expected to generate in the order of 138 and 151 trips in the AM and PM peak hour, respectively and 1,930 daily trips
- The Aimsun model from the previous study was used to determine the background traffic and traffic distribution given it has been prepared over the past decade for this development and has been largely accepted by Council
- SIDRA intersection analysis was undertaken in the year of opening (2027) for the proposed development. The analysis identified the following for the key intersections:
  - North Shore Boulevard / Mount Low Parkway performed below practical operating capacity as the existing 3-way signalised intersection (LOS C in the AM Peak / LOS B in the PM Peak)
  - North Shore Boulevard / Road 1 performed below practical operating capacity as a priority-controlled intersection both in the BAL / BAR and AUL / CHR configuration (LOS A in the AM and PM Peak)
  - North Shore Boulevard / Lionel Turner Drive performed below practical operating capacity as a priority-controlled intersection and signalised intersection (LOS A & LOS B in the AM peak / LOS C & LOS B in the PM Peak).
- The Ultimate layouts identified the following for the key intersections:
  - North Shore Boulevard / Mount Low Parkway performed below practical operating capacity as a 4-way signalised intersection (LOS C in the AM and PM Peak)
  - North Shore Boulevard / Road 1 performed below practical operating capacity as a 4-way signalised intersection (LOS C in the AM and PM Peak)
  - North Shore Boulevard / Lionel Turner Drive performed below practical operating capacity as a signalised intersection (LOS B in the AM Peak / LOS C in the PM Peak).

Based on the findings of this report, we are of the opinion that there are no traffic engineering related matters to preclude approval of this development application.

Appendix A: Development Plans

Lot Type	Lot Size	No.of Lots
	28m Deep	
Premium Traditional	20.0m x 28m	1
	32m Deep	
Courtyard	15.0m x 32m	25
Traditional	18.0m x 32m	41
Premium Traditional	20.0m x 32m	33
Lifestyle	22.0m x 32m	26
	35m+ Deep	
Courtyard	15.0m x 35m	7
Traditional	18.0m x 35m	13
Premium Traditional	20.0m x 35m	13
Lifestyle	22.0m x 35m	4
Total		**163**

Legend

- Site boundary
- Stage boundary
- Watercourse
- Open space & stormwater treatment (within Balance Lot 1003)
- Small local park
- Sewer pump station lot
- Sewer pump station - 30m and 50m buffer

1. Entry statement.
2. 10-14m wide landscaped verge.
3. 2.5m shared footpath.
4. Interim intersection
   Note: The intersection design is based on the existing 2 lane North Shore Boulevard. The future intersection design will include a road connection south.
5. Future Left in / Left out intersection. Not part of this application.
6. Primary stormwater treatment area.
7. Future road connection.

Note:
All Lot Numbers, Dimensions and Areas are approximate only, and are subject to survey and Council approval.

Dimensions have been rounded to the nearest 0.1 metres.

Areas have been rounded down to the nearest 5m².

The boundaries shown on this plan should not be used for final detailed engineers design.

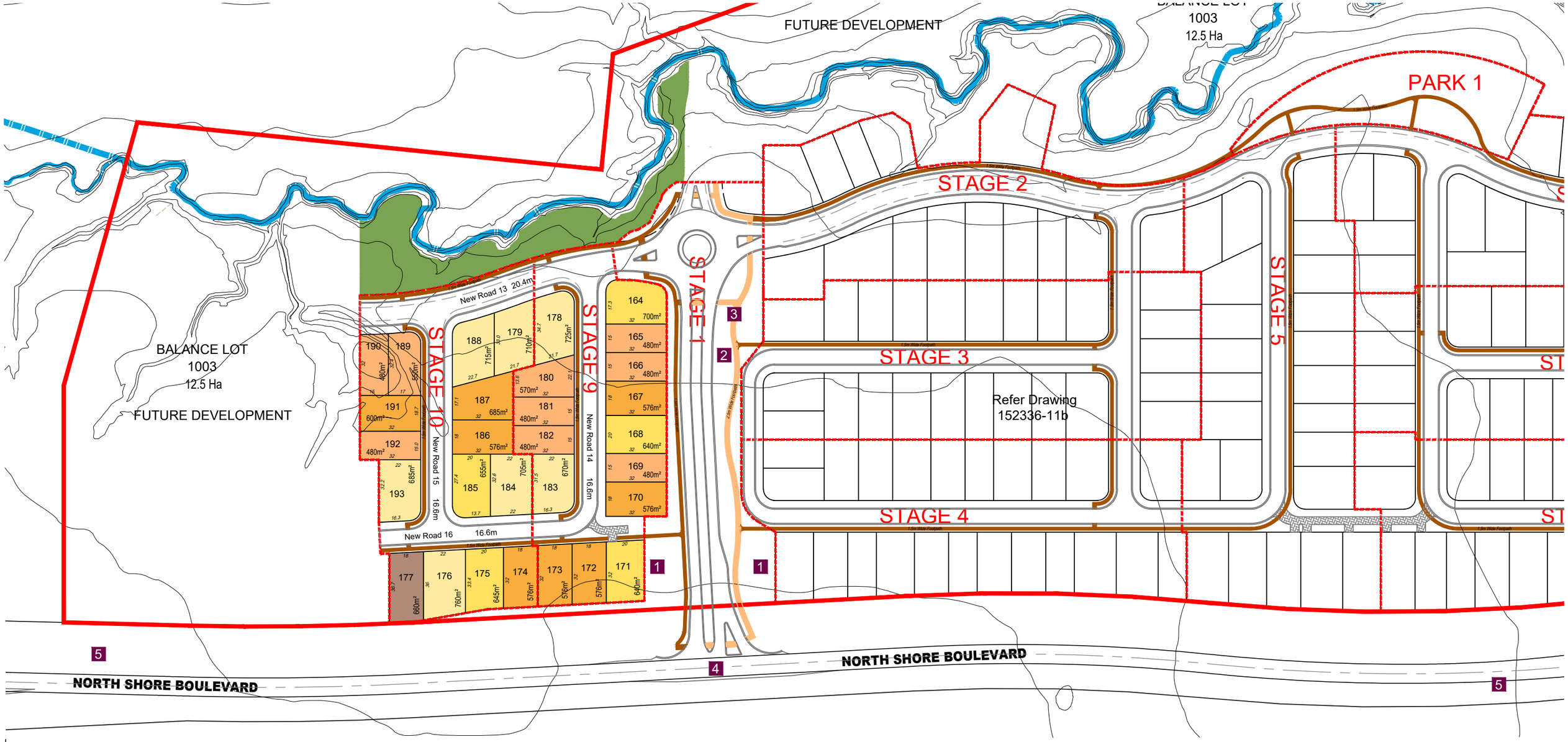
Source Information:
Site boundaries: Registered Survey Plan.
Adjoining information: DCDB.
Contours: Shlenker Lidar (0.25m Intervals)

PLAN REF: 152336 – 11b
DATE: 12th JULY 2024
CLIENT: Bushland Grove Pty Ltd
DRAWN BY: MJB
CHECKED BY: MJB

0 20 40 60 80 100 1 : 2,000 @ A3

MOUNT LOW
RAL PROPOSAL PLAN
1 INTO 195 LOTS + BALANCE - CANCELLING LOT 1001 SP345441

URBAN DESIGN
Unit 1
5-7 Barlow Street
South Townsville QLD 4810
T +61 7 4724 4244
W rpsgroup.com



Lot Type	Lot Size	No. of Lots
	28m Deep	
Lifestyle	22m x 28m	0
	32m Deep	
Courtyard	15.0m x 32m	9
Traditional	18.0m x 32m	8
Premium Traditional	20.0m x 32m	5
Lifestyle	22.0m x 32m	7
	35m+ Deep	
Courtyard	15.0m x 35m	0
Traditional	18.0m x 35m	1
Premium Traditional	20.0m x 35m	0
Lifestyle	22.0m x 35m	0
Total		**30**

Legend

- Site boundary
- Stage boundary
- Watercourse
- Open space & stormwater treatment (within Balance Lot 1003)
- Small local park
- Sewer pump station - 30m and 50m buffer

1. Entry statement.
2. 10-14m wide landscaped verge.
3. 2.5m shared footpath.
4. Interim intersection
   Note: The intersection design is based on the existing 2 lane North Shore Boulevard. The future intersection design will include a road connection south.
5. Future Left in / Left out intersection. Not part of this application.

Note:
All Lot Numbers, Dimensions and Areas are approximate only, and are subject to survey and Council approval.

Dimensions have been rounded to the nearest 0.1 metres.

Areas have been rounded down to the nearest 5m².

The boundaries shown on this plan should not be used for final detailed engineers design.

Source Information:
Site boundaries: Registered Survey Plan.
Adjoining information: DCDB.
Contours: Shlenker Lidar (0.25m Intervals)

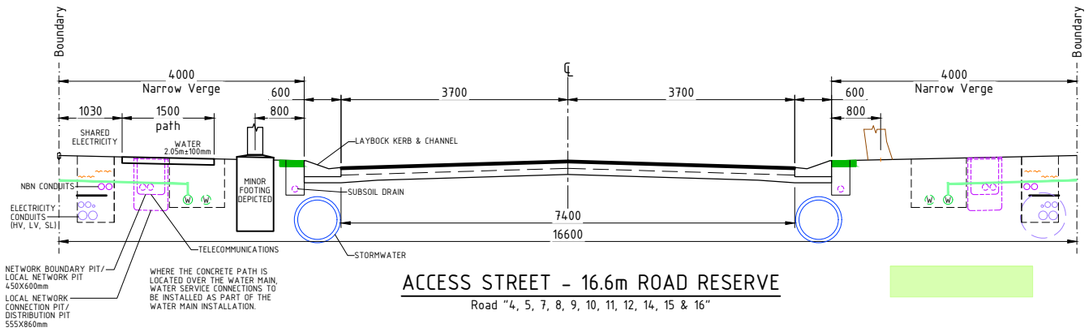
PLAN REF: 152336 – 12b
DATE: 12th JULY 2024
CLIENT: Bushland Grove Pty Ltd
DRAWN BY: MJB
CHECKED BY: MJB

0 20 40 60 80 100 1 : 2,000 @ A3

MOUNT LOW
RAL PROPOSAL PLAN
1 INTO 195 LOTS + BALANCE - CANCELLING LOT 1001 SP345441

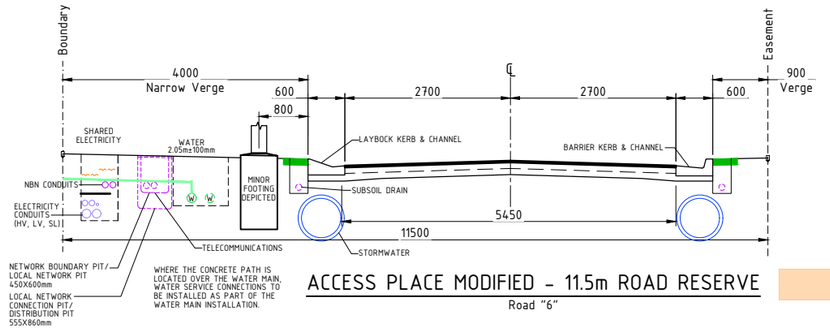
URBAN DESIGN
Unit 1
5-7 Barlow Street
South Townsville QLD 4810
T +61 7 4724 4244
W rpsgroup.com

Appendix B: Alternative Road Cross Sections



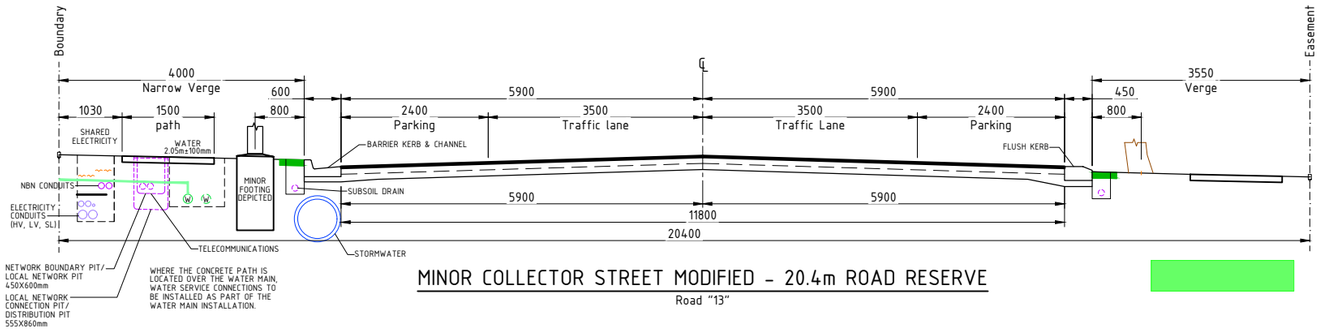
ACCESS STREET – 16.6m ROAD RESERVE

Road "4, 5, 7, 8, 9, 10, 11, 12, 14, 15 & 16"



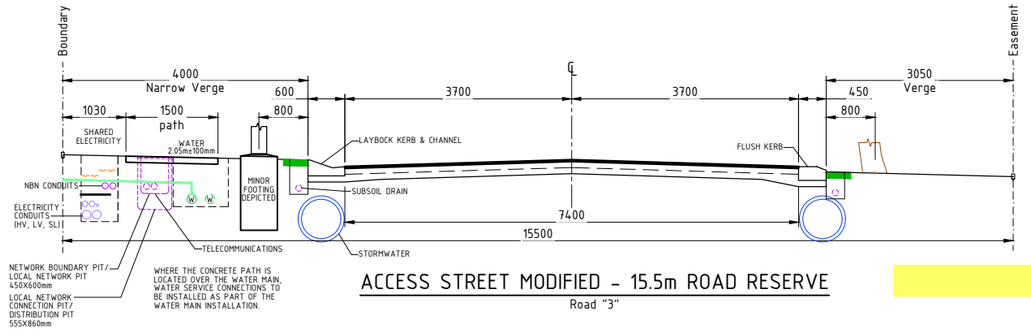
ACCESS PLACE MODIFIED – 11.5m ROAD RESERVE

Road "6"



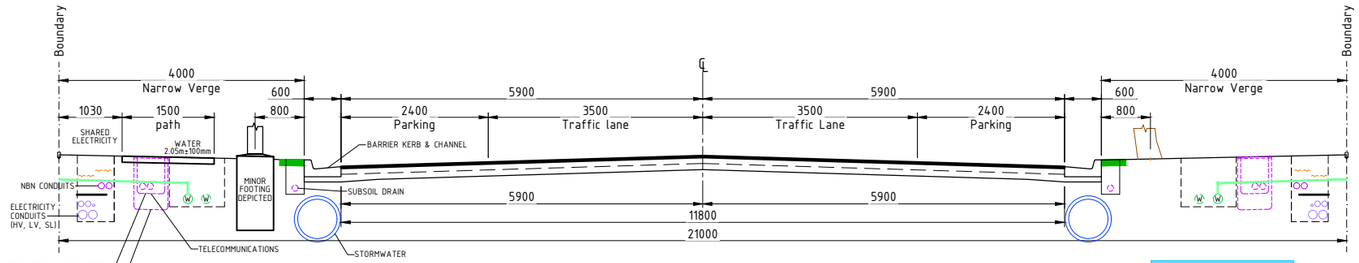
MINOR COLLECTOR STREET MODIFIED – 20.4m ROAD RESERVE

Road "13"



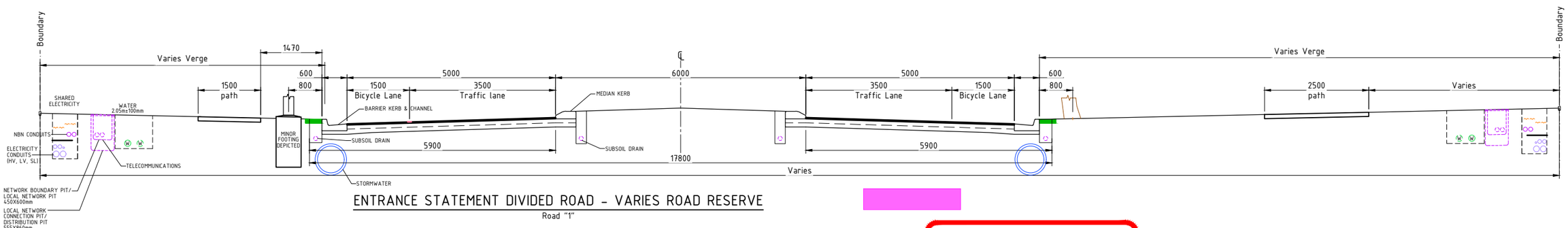
ACCESS STREET MODIFIED – 15.5m ROAD RESERVE

Road "3"



MINOR COLLECTOR STREET – 21.0m ROAD RESERVE

Road "2"



ENTRANCE STATEMENT DIVIDED ROAD – VARIES ROAD RESERVE

Road "1"

TYPICAL ROAD CROSS SECTIONS

PRELIMINARY
NOT FOR CONSTRUCTION

Scale 1:50 @ A1
0 0.5 1.0 1.5 2m

All work is to be carried out in accordance with LOCAL AUTHORITY'S standard details.

Issue	Description	Date
P1	PRELIMINARY – NOT FOR CONSTRUCTION – ISSUED FOR INFORMATION ONLY.	25/06/2024

ENGINEERING CERTIFICATION

Signed:

ANDREW IAN WALLACE – RPEQ No. 6743

THE ORIGINAL OF THIS DOCUMENT IS COMPLETED TO THE SCALE NOTED. AS REPRODUCTION CAN DISTORT SIZE & SHAPE USE ONLY THE DIMENSIONS PROVIDED ON ARCHITECTURAL &/OR ENGINEERING DRAWINGS. VERIFY DIMENSIONS ON SITE BEFORE CONSTRUCTION.

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W: www.nceng.com.au

Drawn: DC
Date: 25/06/2024
Checked: DC
Approved: AW

In Association With
MOUNT LOW DEVELOPMENTS

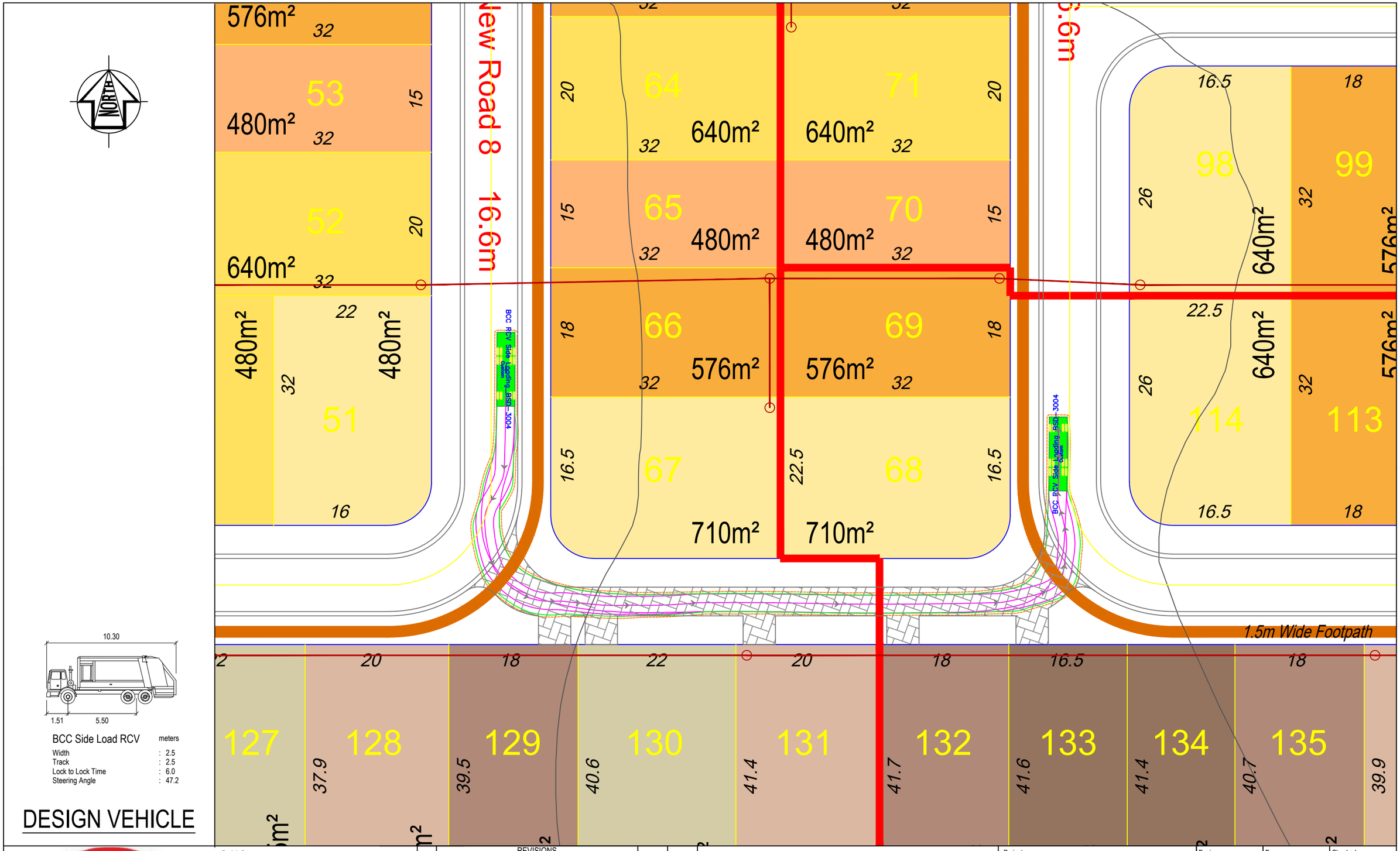
RIDGE PADDOCK RESIDENTIAL DEVELOPMENT – PRECINCT ONE
NORTH SHORE BOULEVARD
MOUNT LOW (93 on SP222103)

CONCEPT
ROAD CROSS SECTIONS

Drawing Number: TUR1301/R02
Issue: P1

LEVEL DATUM A.H.D.
Horizontal Datum GDA' 94 Zone 55
Refer PM 131730 RL. 74.407
Star Picket

Appendix C: Swept Path Assessment



BCC Side Load RCV — meters

Width	: 2.5
Track	: 2.5
Lock to Lock Time	: 6.0
Steering Angle	: 47.2

DESIGN VEHICLE

Gold Coast
Suite 26, 58 Riverwalk Avenue, Robina QLD 4226
P: (07) 5562-5377
W: www.bitziosconsulting.com.au
Brisbane
Level 2, 428 Upper Edward Street, Spring Hill 4000
P: (07) 3831-4442
E: admin@bitziosconsulting.com.au
Sydney
Studio 203, 3 Gladstone Street, Newtown NSW 2042
P: (02) 9557 6202

Issue	REVISIONS Revisions/Descriptions	Drawn	Date
001	Swept Paths Assessment	R.TU	23.08.2023
002	Swept Paths Assessment	B.C	19.07.2024

Scale @ A3 — 0 5 10 15 20 25 — 1:500

ENGINEERING CERTIFICATION (RPEQ)

Name	Signature	No.	Date

Project: Mount Low Precinct TIAs

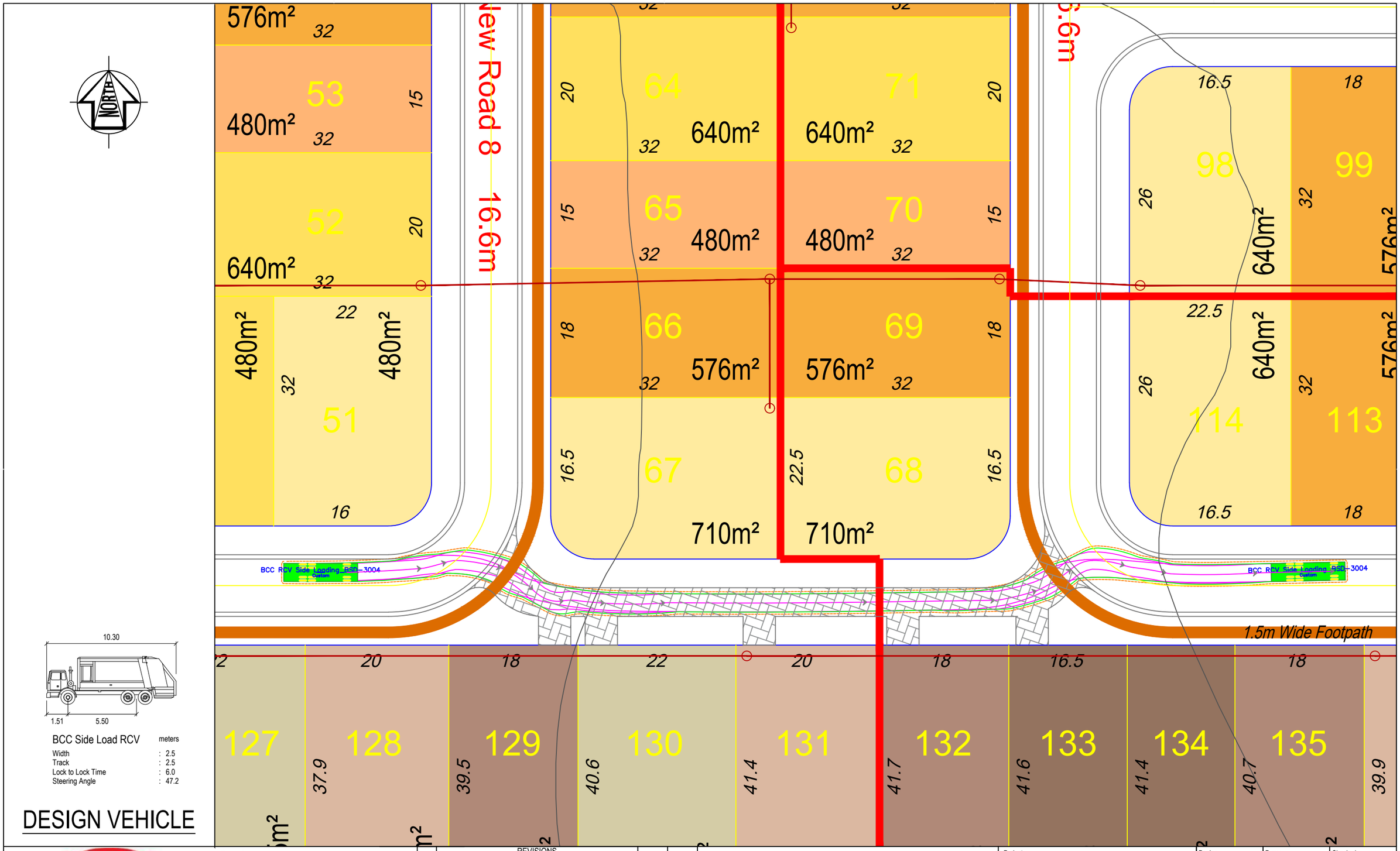
Title: RCV - Eastbound Left In Left Out

Design	Drawn	Checked
B.C	B.C	E.S

CONCEPT ONLY

Date: 19.07.2024

Project Number	Sheet Number	Issue
P6519	1	002



BCC Side Load RCV	meters
Width	: 2.5
Track	: 2.5
Lock to Lock Time	: 6.0
Steering Angle	: 47.2

DESIGN VEHICLE

Gold Coast
Suite 26, 58 Riverwalk Avenue, Robina QLD 4226
P: (07) 5562-5377
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Studio 203, 3 Gladstone Street, Newtown NSW 2042
P: (02) 9557 6202

Issue	REVISIONS Revisions/Descriptions	Drawn	Date
001	Swept Paths Assessment	R.TU	23.08.2023
002	Swept Paths Assessment	B.C	19.07.2024

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ENGINEERING CERTIFICATION (RPEQ)

Name	Signature	No.	Date

Project: Mount Low Precinct TIAs

Title: RCV - Eastbound Right In Right Out

Design	Drawn	Checked
B.C	B.C	E.S

CONCEPT ONLY

Date: 19.07.2024

Project Number	Sheet Number	Issue
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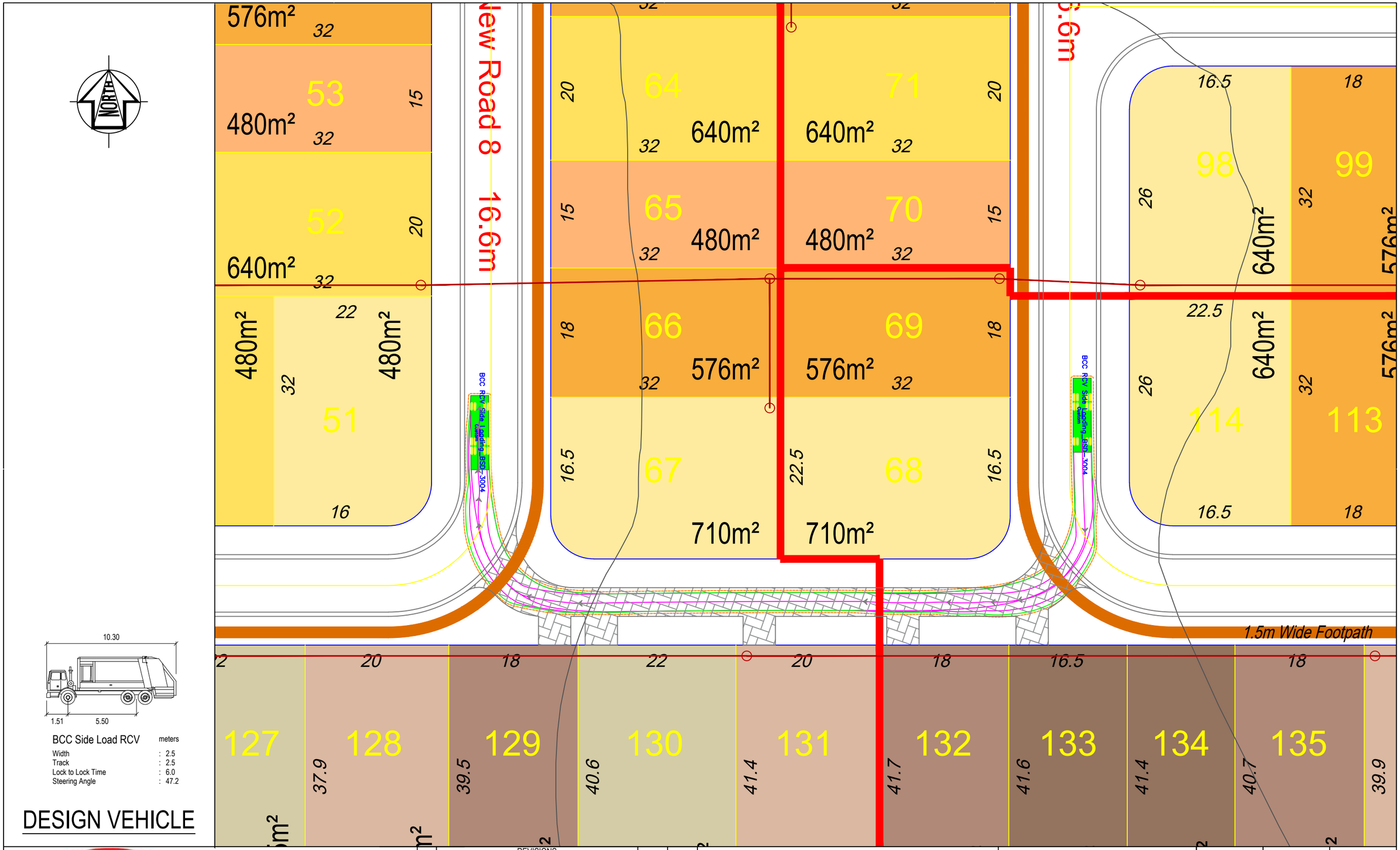

BCC Side Load RCV	meters
Width	: 2.5
Track	: 2.5
Lock to Lock Time	: 6.0
Steering Angle	: 47.2

DESIGN VEHICLE

Gold Coast
Suite 26, 58 Riverwalk Avenue, Robina QLD 4226
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Sydney
Studio 203, 3 Gladstone Street, Newtown NSW 2042
P: (02) 9557 6202

Issue	REVISIONS Revisions/Descriptions	Drawn	Date
001	Swept Paths Assessment	R.TU	23.08.2023
002	Swept Paths Assessment	B.C	19.07.2024

Scale @ A3 0 5 10 15 20 25 1:500

ENGINEERING CERTIFICATION (RPEQ)

Name	Signature	No.	Date

Project: Mount Low Precinct TIAs

Title: RCV - Westbound Right In Right Out

Design	Drawn	Checked
B.C	B.C	E.S

CONCEPT ONLY

Date: 19.07.2024

Project Number	Sheet Number	Issue
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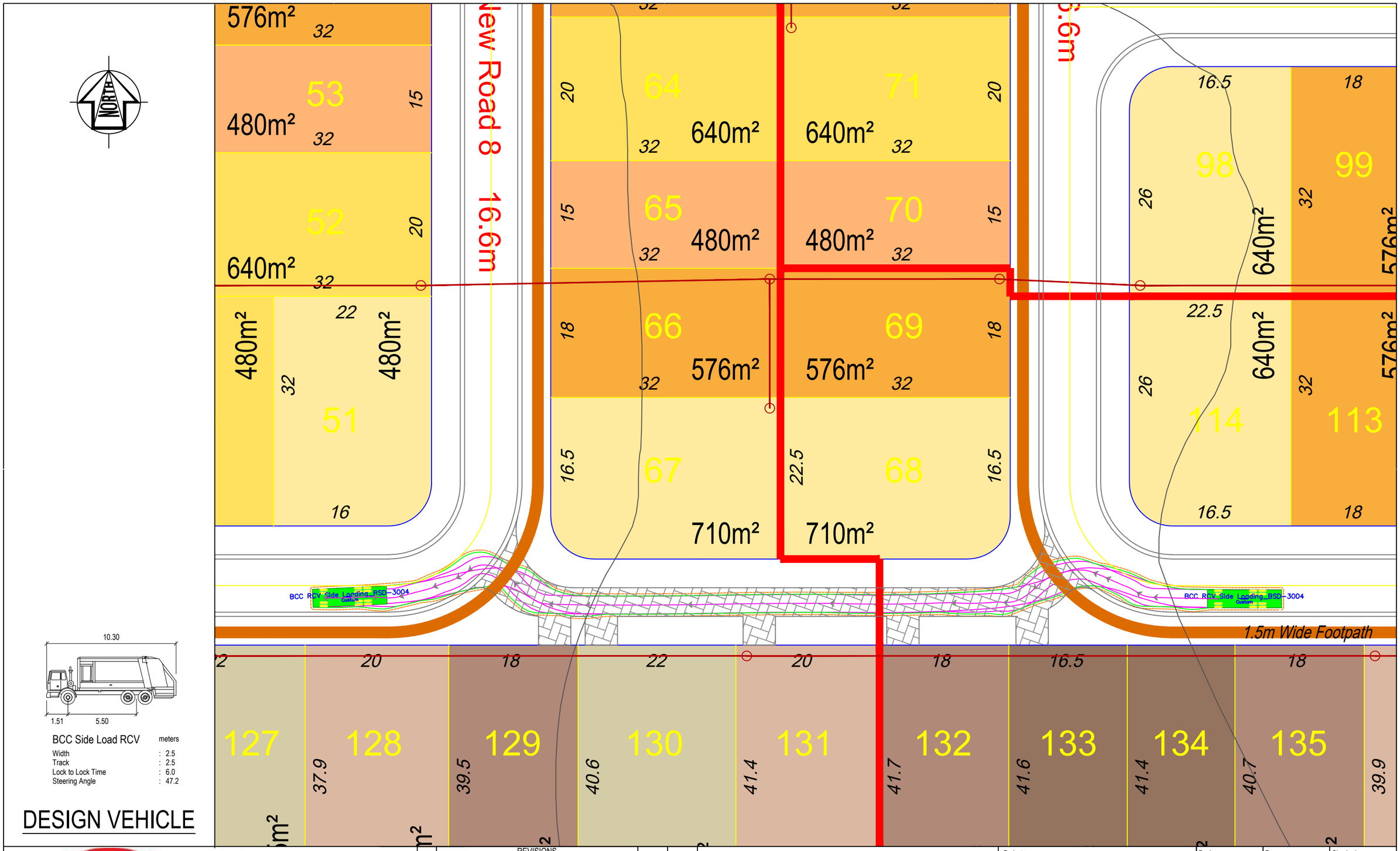

BCC Side Load RCV	meters
Width	: 2.5
Track	: 2.5
Lock to Lock Time	: 6.0
Steering Angle	: 47.2

DESIGN VEHICLE

Gold Coast
Suite 26, 58 Riverwalk Avenue, Robina QLD 4226
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Sydney
Studio 203, 3 Gladstone Street, Newtown NSW 2042
P: (02) 9557 6202

Issue	REVISIONS Revisions/Descriptions	Drawn	Date
001	Swept Paths Assessment	R.TU	23.08.2023
002	Swept Paths Assessment	B.C	19.07.2024

Scale @ A3 0 5 10 15 20 25 1:500

ENGINEERING CERTIFICATION (RPEQ)

Name	Signature	No.	Date

Project: Mount Low Precinct TIAs

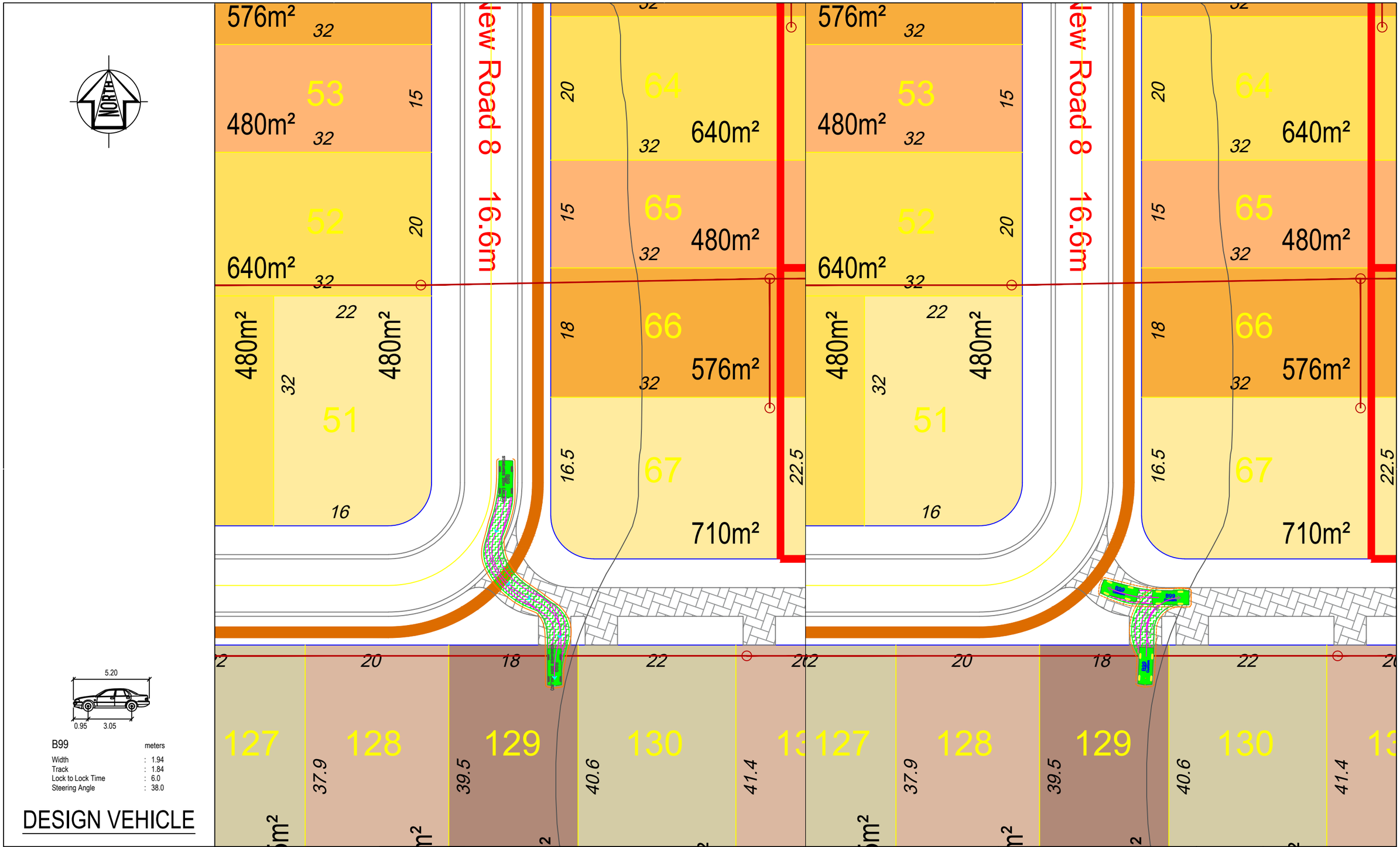
Title: RCV - Westbound Left In Left Out

Design	Drawn	Checked
B.C	B.C	E.S

CONCEPT ONLY

Date: 19.07.2024

Project Number	Sheet Number	Issue
P6519	4	002



B99	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 38.0

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Issue	REVISIONS Revisions/Descriptions	Drawn	Date
001	Swept Paths Assessment	R.TU	23.08.2023
002	Swept Paths Assessment	B.C	19.07.2024

Scale @ A3 0 5 10 15 20 25 1:500

ENGINEERING CERTIFICATION (RPEQ)

Name	Signature	No.	Date

Project: Mount Low Precinct TIAs

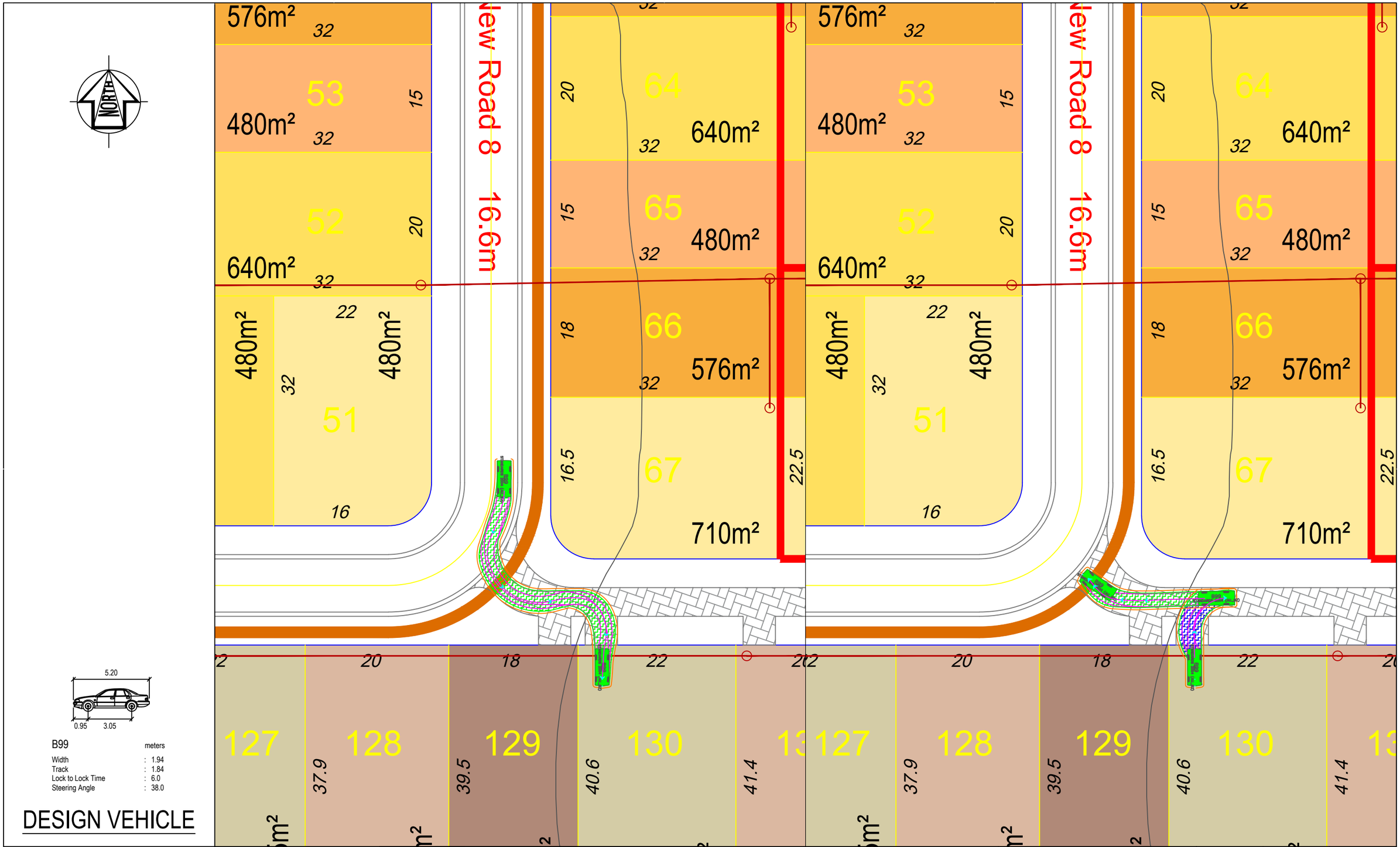
Title: B99 Ingress & Egress
Lot 129

Design	Drawn	Checked
B.C	B.C	E.S

CONCEPT ONLY

Date: 19.07.2024

Project Number	Sheet Number	Issue
P6519	5	002



B99	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 38.0

DESIGN VEHICLE

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Issue	REVISIONS Revisions/Descriptions	Drawn	Date
001	Swept Paths Assessment	R.TU	23.08.2023
002	Swept Paths Assessment	B.C	19.07.2024

Scale @ A3 0 5 10 15 20 25 1:500

ENGINEERING CERTIFICATION (RPEQ)

Name	Signature	No.	Date

Project: Mount Low Precinct TIAs

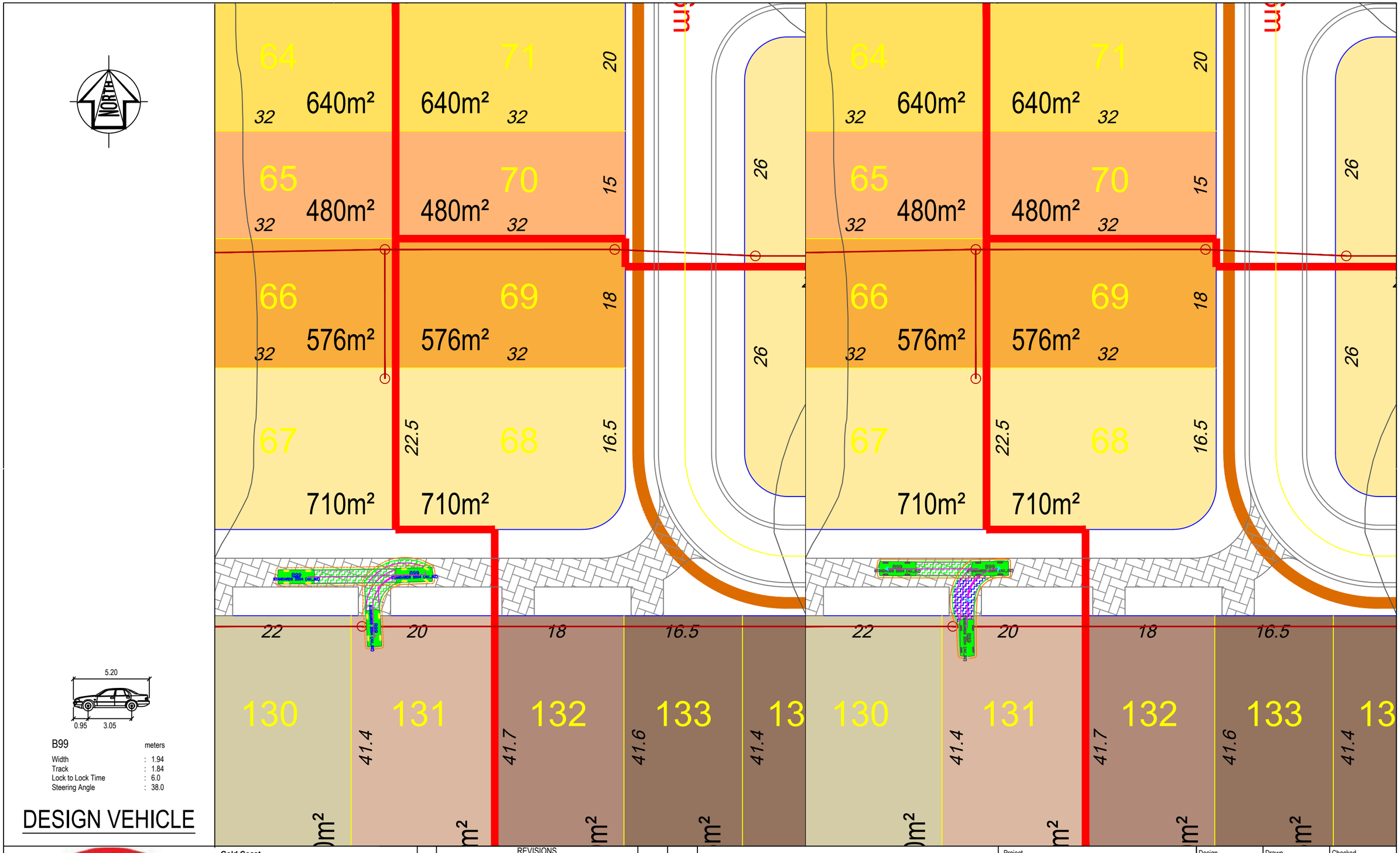
Title: B99 Ingress & Egress
Lot 130

Design	Drawn	Checked
B.C	B.C	E.S

CONCEPT ONLY

Date: 19.07.2024

Project Number	Sheet Number	Issue
P6519	6	002



B99	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 38.0

DESIGN VEHICLE

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Issue	REVISIONS Revisions/Descriptions	Drawn	Date
001	Swept Paths Assessment	R.TU	23.08.2023
002	Swept Paths Assessment	B.C	19.07.2024

Scale @ A3 — 0 5 10 15 20 25 — 1:500

ENGINEERING CERTIFICATION (RPEQ)

Name	Signature	No.	Date

Project: Mount Low Precinct TIAs

Title: B99 Ingress & Egress
Lot 131

Design	Drawn	Checked
B.C	B.C	E.S

CONCEPT ONLY

Date: 19.07.2024

Project Number	Sheet Number	Issue
P6519	7	002